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Improvement in Feeder for Wool Breakers.

This machine supplies what has long been a great want of the woolen trade, and will doubtless be received as such by those interested. It feeds the wool on to the first breaker card evenly, thus saving a large amount of labor and insuring uniformity of work, which has been impossible by hand feeding. In the accompanying engravings, A is a box into which the wool is loosely thrown, B is an ordinary slat apron, carrying the wool forward toward a vertical apron, C, which is furnished with spikes or forks, which continually lift the wool from the apron, B, to the shorter apron, F, which carries it forward to the feed rolls, H. G is a picker roll, which performs the double function of preventing any large locks of wool from passing on to the apron, F, unopened, and also of keeping the fan, D, clear of wool. I is a movable plate of sheet iron, which with the apron, F, forms a throat for the reception of the wool, and the size of this throat can be enlarged or reduced by raising or lowering the iron plate, I, which is readily done. The operation of the machine is briefly as follows: The wool thrown into the box is carried forward and upward by the two aprons, B and C, to the short apron, F, and is delivered in larger quantities than is required by the card. At this point it is blown by the fan, D, into the "throat," which is thus always kept full, and the surplus is returned to the box, as shown in Fig. 2. It will be manifest to all who examine the subject that the size of the throat will regulate the quantity of wool delivered to the card, which has hitherto been entirely controlled by the speed of the feed rolls. This can still be governed in the same way if preferred, so that any weight of roping can be produced.

Fig. 1.

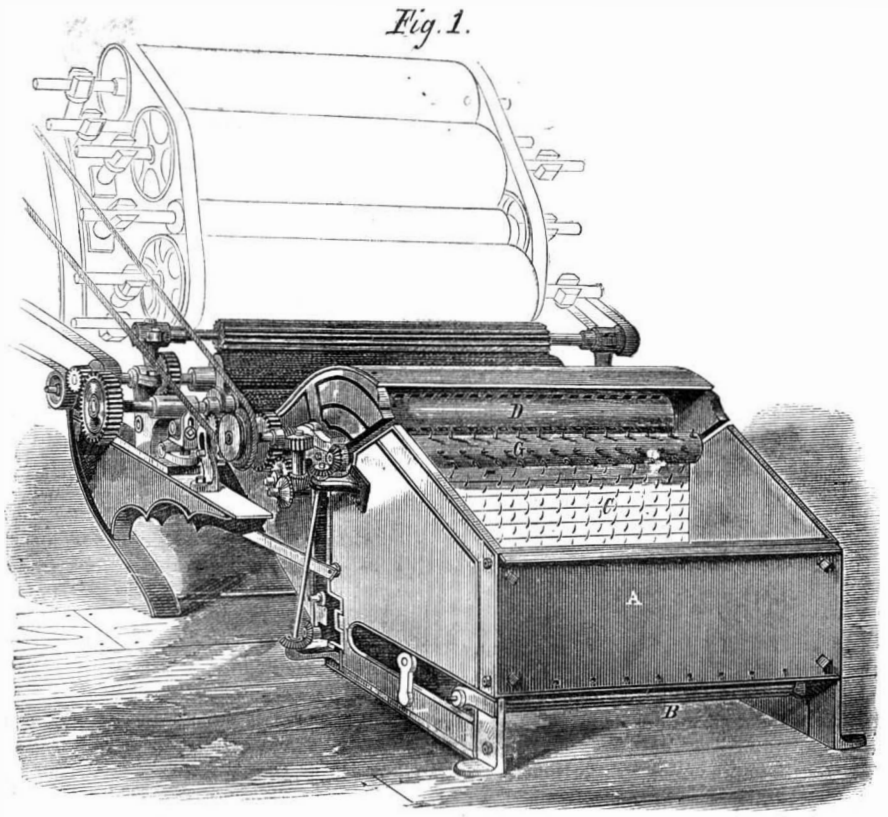
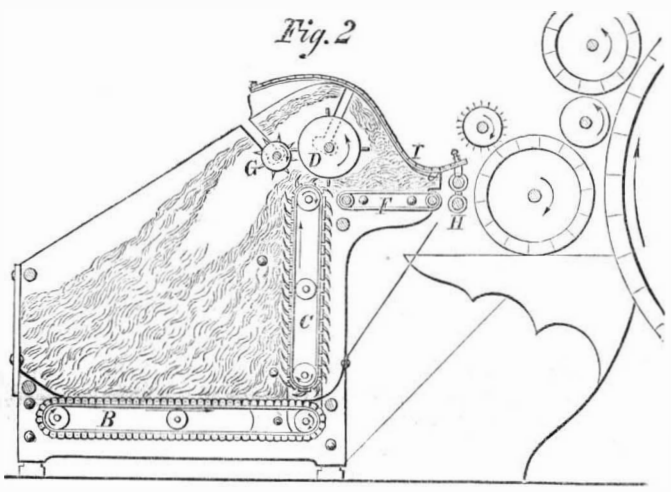


Fig. 2

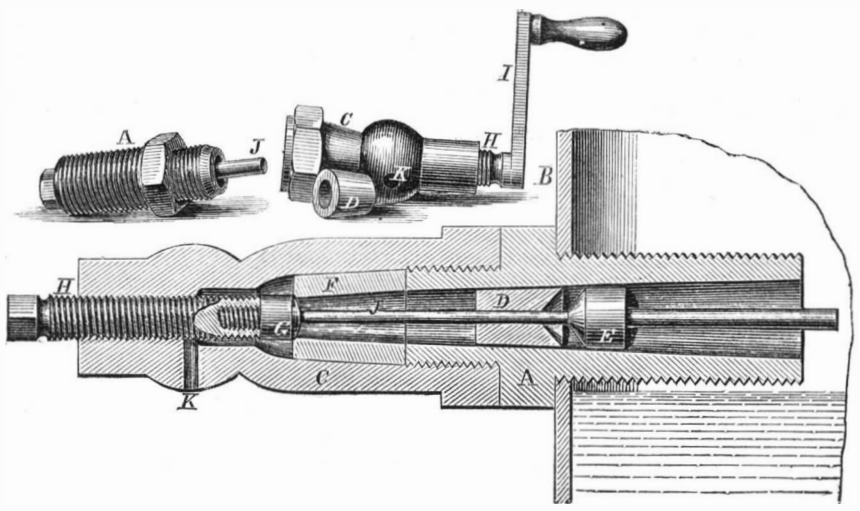


This machine was patented August 23, 1864, and is offered for sale by Harwood & Quincy, 25 Bromfield street, Boston, Mass., who will supply all information regarding it.

Improvement in Steam Boiler Gage Cocks.

Sometimes the gage cocks of a boiler become worn and leaky, and it is necessary to re-seat their valves. This can be done only when the steam is down. The object of the peculiar construction of the cock shown in the accompanying engravings is to allow this necessary work to be done at any time, when there is a full head of steam on as well as when the boiler is cold. This is effected by forming the cock in two parts, both of which are furnished with valves, one opening outward and the other inward.

The part, A, has a threaded stem with nut formed on it for seating it in the boiler head, B. The outer end of A is of reduced size and also threaded to receive the part, C, the shoulders of A and C coming together when the parts are united. The bore of A is slightly conical and receives a valve seat, D, in which fits the inward opening valve, E. The part, C, has also a valve seat, F, in the outer end of which is seated the valve, G, operated by the screw, H, and handle, I, in the usual manner. The valve, G, is seated in the screw, H, by means of a thread, as seen. The inner valve, E, is provided with a stem, J, of such a length that its end bears against the inner surface of the valve, G, except when the latter is moved out much further than is necessary to try the steam or water, or the part, C, is wholly removed from the fixed portion, A. In such a case the pressure of the steam closes the valve, E, preventing the escape of steam or water from the boiler. This allows the removal of the part, C, for repairs or re-seating the valve, when the remaining valve, E, can be operated as a try cock by pressing on its projecting stem, J. In ordinary use, when the parts are joined, this stem prevents the closing of the valve, E, and allows the steam or water to escape through the opening, K.



THOMAS' BISECTED GAGE COCK.

The advantages of this gage are sufficiently apparent without further description. We consider it to be a valuable improvement.

Patented January 21, 1868, by William G. Thomas, who may be addressed relative thereto at Centralia, Pa.

GAS MEASUREMENT.

In the entire range of articles in ordinary use, there is probably not one that is measured with greater average accuracy than illuminating gas, and probably there is not another, in the accurate measurement of which the public at large have so little confidence. There are many reasons for the origin of such doubts, most of which must be charged to the consumers, some of them to the gas-manufacturing companies, and the balance to the defective method of selling gas, at a given rate per thousand cubic feet, as is generally the case, without regard to quality.

Most people who use gas do not take any pains to inform themselves in regard to the manner of its measurement, do not understand even the fundamental principles of a gas meter, and have not the least idea of its construction. Some might, no doubt, be found who can not even read the ordinary dial correctly.

The effect of such ignorance is suspicion and doubt. In vain may meter inspectors test, and meter manufacturers labor to convince the public of the accuracy of gas meters while it exists. The dissatisfaction engendered by want of information is increased by the irregularity of amounts consumed in different periods of time without (to the consumer) any apparent cause. Were the bills constant in amount, or only increased as the nights lengthen, to be again diminished as the demand for artificial light decreases with the approach of summer, many would be content to believe in the justness of the measurement without further question; but such is not the universal experience. A merchant, perhaps, having paid a bill for gas used in his warehouse in January, is surprised and indignant to find that it is as large, or nearly as large, for April. An individual complains that the gas bill last presented to him is as large as the one for the previous month when "he had sickness in his family and gas was kept burning all night for a week." Indeed the opinion of many sufficiently intelligent to judge fairly about ordinary business transactions, is that gas meters are a humbug and a blind, used only to give a show of fairness in assessments, and that gas bills, like doctor's bills, are made out upon the principle of about how much, from the apparent character of their residences, and other indications of wealth or poverty, people will submit to without protest. These opinions are erroneous, as we shall proceed to show: the fact being, that the errors of gas meters, when errors exist, are mostly in favor of the consumer. In order to corroborate our statement, it will be necessary to explain the construction and operation of gas meters. In doing this we shall, as much as possible, avoid technical terms, and shall use the simplest illustrations, our object being not to enlighten those who are already informed upon the subject, but to show, in the plainest manner, to those who have not correct ideas of gas meters, the principles upon which they are constructed.

Gas meters are of two kinds—wet and dry. Wet meters are so called because it is essential to their operation to keep a certain level of some liquid (water or glycerin), within the case. Dry meters do not require any such appliance, hence the name applied to them. Dry meters are the more commonly used on account of their requiring less attention than wet meters, which have, when water is used, to be kept supplied with it and protected from frost. The use of glycerin obviates the replenishing and care to prevent freezing, as that liquid is non-volatile, and not liable to be frozen.

To understand the principle of the wet gas meter, it is only necessary to imagine a wheel, having buckets attached to the perimeter, the top of each bucket placed toward the bottom of the next one in order, forming a series entirely around it. Imagine, further, the wheel immersed in a tub of water to somewhat more than half its diameter, its axle being supported by bearings attached to the sides of the tub. Let a pipe pass through the side of the tub near the bottom and turn up under the series of buckets on that side where the buckets are bottom side up. Now invert another tub of equal size to the first one, over it, close the joint air-tight, and insert a tube in that, and you have a rude wet gas meter. If gas is forced into the lower tube, the upper one being left open, it will bubble up through the fluid and fill the inverted buckets of the series, which, being thus rendered buoyant, will rise to the surface, and in so doing, revolve the wheel to which they are attached, and bring other buckets of the series over the mouth of the pipe. Thus a continuous rotation would be kept up provided that the buckets could be so arranged that less power is required to force the buckets under the surface of the fluid than their buoyancy upon the opposite side is able to overcome. In actual practice this is accomplished by a very ingenious arrangement. The pipe in the up per inverted tub permits the discharged gas to escape from the meter. Now, the number of buckets in the series being known, and the amount which they will each hold, it is an easy matter to determine the amount of gas discharged at each revolution of the wheel, or for any number of revolutions. Suppose it to be a cubic foot for each revolution: then a pinion of six teeth, attached to the axle of the bucket wheel, working upon a wheel of sixty teeth, would, in revolving once, move the latter one tenth of a revolution. If to this wheel a pointer and dial were attached, and upon the dial the nine digits and zero were placed at equal intervals, this

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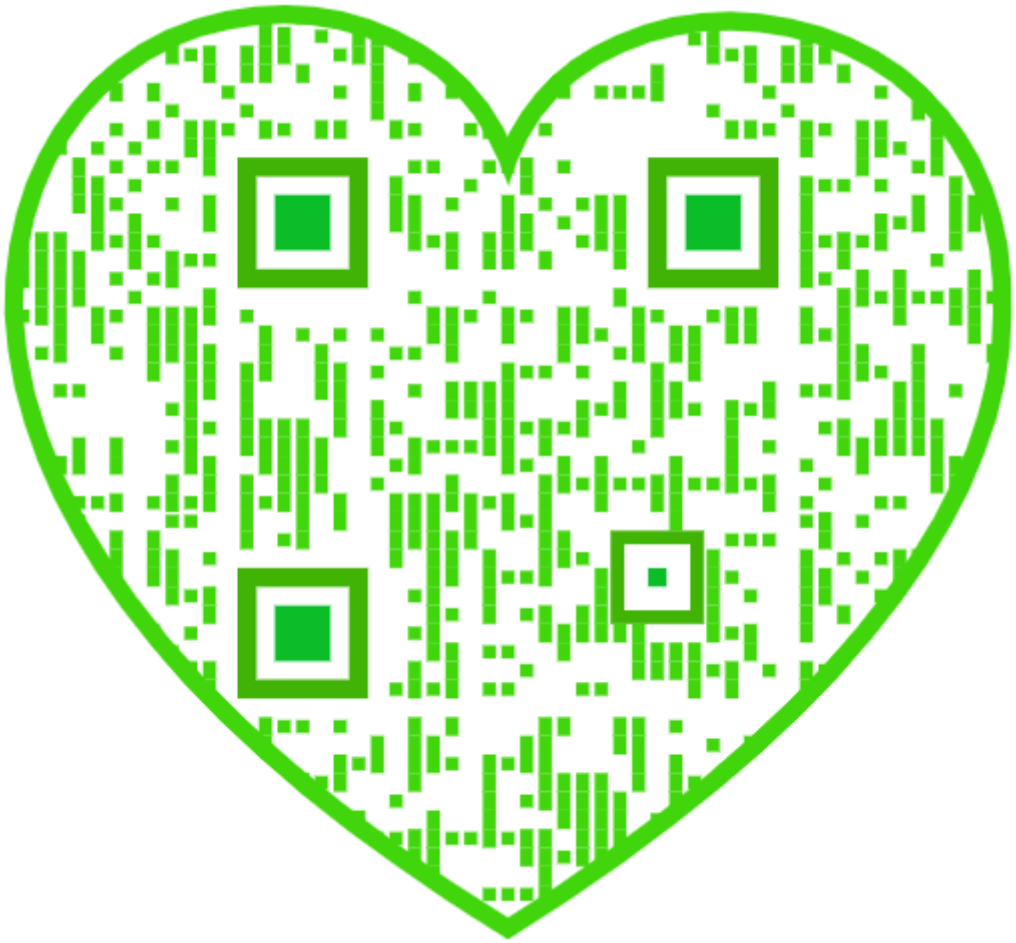

pointer would mark units of cubic feet. If to the axis of the units wheel a pinion of six teeth were attached, working into another wheel of sixty teeth, the latter would be a wheel of tens, and so on. The level must be kept at a constant point, and in wet meters there is generally a device for stopping the flow of gas the instant the level becomes too low.

Dry meters consist of a series of bellows inclosed in a case, and so arranged that they are alternately filled and discharged, the filling of one furnishing the necessary power for the discharge of another, and so on, each being successively filling and discharging. The reciprocal motion thus obtained is converted into a rotary motion by cranks set at right angles to each other and so arranged that a rotation is made for every time that the bellows are filled and emptied once. The cranks alluded to perform two offices, the first of which is to open and shut the valves which direct the flow of gas into the different bellows, and second, to give motion to a system of wheels and pinions having the number of their teeth in a tenfold ratio to each other, and impelling pointers over dials, precisely as described, for wet meters.

Now let us notice the obstructions to which the two kinds of meters are liable, and we shall see that their effect is against the producers of gas and in favor of the consumers. We premise, of course, that the meter is a perfect one when it is connected with the service pipe, and we will here state that the apparatus for testing meters is as certain and reliable as any used for sealing weights and measures, and that the sealing is performed by an officer bound and sworn to perform his duty faithfully, not in the employ of any company, and that his seal, according to law, must be upon every meter before it is used. The inspector's seal is evidence that, either himself or one of his deputies have tested the meter upon which it is placed and found it to be correct in its measurement. Wet meters may vary in their measurement by the axle (spindle) becoming fixed. In such case the gas would bubble up from beneath the fluid, the flow would not cease while the registering would stop—the producer, and not the consumer, losing the amount thus passed and not registered. They may vary from leakages, which sometimes occur in the buckets. In this case all the gas which leaks is lost to the producers. They may vary from the water level getting too low. When this occurs, the construction of the bucket wheel (drum) is such that the gas does not pass under the buckets, but gurgles up by the side and passes out without being registered. This fact alone would render a wet meter worthless (as it would place the sellers of gas at the mercy of the honesty of consumers), were it not provided against by an apparatus above alluded to, which closes the mouth of the service pipe and shuts off the flow of gas whenever the level becomes too low for correct registering. This apparatus consists of a hollow ball which floats upon the surface of the water. The ball is connected by a wire with a plug (valve), and when the level becomes, by evaporation or other causes, too low for accurate measurement, the plug stops the mouth of the pipe and obliges the consumer to supply the requisite amount of liquid to restore the level. The wire attached to the plug may sometimes stick in its guides. When this takes place the effect is evidently in favor of the consumer. Another cause of error may be the sticking of the axle of the bucket wheel, caused by tarry deposits from the gas. This must also favor the consumer, as the harder the meter works the more compression of the gas takes place in the buckets, so that more gas of a given density is required to rotate the drum than would otherwise be required. Of course, leaks through the outer case, or through pipes, cocks, or burners, which are supplied through the meter, are losses to the consumer, but he is solely to blame for such losses, and ought to sustain them. Dry meters are subject to variations from all the causes which we have enumerated, except those which depend upon the maintaining of the water level. Both may vary on account of temperature, and this is probably the only way in which the consumer can lose by their irregularities, as the gas, at an elevated temperature, will measure more for the same amount of illumination, than it will at a low temperature. It is therefore for the interest of the consumers to have meters set up in cool places.

The differences in the amount of gas bills may be attributed partly to the consumers. Burners which have been used long will generally pass more gas than new ones, as the apertures are frequently enlarged; and unless the flow of gas is stopped through the day, and at such times as the gas is not required, more or less leakage is liable to take place, and this leakage will be registered by the meter along with that which is burned. The great source of difference in gas bills is, however, the fault of the producers, who can vary the quality of the gas at pleasure. More poor gas, that is such gas as is poor on account of its deficiency in illuminating power, can be passed through burners without "blowing," than rich gas, or gas of high illuminating power. When such gas is furnished, the consumer unconsciously uses more volume for a given amount of light. In Europe, gas companies are obliged by law to supply gas of a specified richness; but in this country, if any such law exists, it is practically a dead letter, as the gas furnished by most companies is not kept up to any standard quality. This is the prime cause of the trouble. The meters are not to blame—they only measure quantity, and they do that well. If you purchase a quart of ostensible milk which has been diluted by a gill of Croton water, you do not blame the measuring cup.

The selling of gas by quantity only is an anomaly in domestic commerce, rendered possible simply because people in general cannot test its quality; other than by the effect it produces upon their pockets, after it is used, and the demand for payment cannot be evaded. The preventive is in the yet uninvented gas meter that shall register for quality as well as quantity, or in stringent laws that shall compel gas companies to make gas of a standard quality.

ICE---ITS COLLECTION, STORAGE, AND DISTRIBUTION.

This substance, from time immemorial, in the countries of the Eastern Hemisphere, an article of luxury, has become one of prime necessity the world over. It enters into almost every house and place of business, contributing its grateful coolness to the water, rendered insipid and tasteless by the fervid heats of summer; it operates by its antiseptic power in the preservation of meats, vegetables, and fruits in a fresh condition, unchanged by the action of salt or brine; it freezes the creams and cools the mineral water of the confectioner, and aids the pharmaceutist in the condensation of distillates, the preparation of freezing mixtures, and the cooling suppositories and ointments, and furnishes a substitute of no mean value for distilled water. So varied and important are its uses, and so valuable is it in the operations conducted in the laboratory of the chemist and pharmaceutist, and so extensive the business and capital concerned in its collection and distribution, that a few notes respecting it have not been deemed as misplaced in this journal.

Fifty or sixty years ago Mr. Frederic Tudor, of Boston, entered upon the enterprise of exporting ice to the West Indies. He encountered the greatest difficulties in starting the business, among which was one which would bring a smile upon the face of any twelve-year-old boy of to-day. It was as difficult to charter a vessel to carry ice then, as it would be now to get one to carry nitro-glycerin, and he was obliged to purchase the vessel he at first employed, in order to show that ice is a safe cargo. For several years he continued operations in the face of difficulty, discouragement, and pecuniary loss, and it was not until twenty years after that he succeeded in making it remunerative. Since then the business has gradually increased, and within the last twenty years the growth has been very rapid, especially in that department devoted to the supply of the home consumption. The amount of capital employed, and the extent of the ice trade in the United States is something enormous. Full statistics are lacking, but occasional notices appear in the current news of the day which are extremely suggestive. A communication in the New York *Commercial Advertiser*, written by one who appears to know whereof he affirms, estimates the amount laid up for the consumption of the city trade in 1866, at 580,000 tuns, and during the past winter a statement appeared in some of the papers that there was stored for the consumption of 1868, 750,000 tuns. The writer is informed that the Knickerbocker, the largest ice company of New York, has a million of dollars invested in the business; and from the statements contained in the communication quoted above, the demand for ice will make room shortly for a dozen more like it. These amounts are independent of all that is invested in this trade and the ice that is laid up in Philadelphia, Baltimore, Boston, and other large cities of the Union, and a little consideration will show that the ice business in the United States ranks in importance with almost any one that can be named.

In dealing with the subject on the present occasion, it is proposed to offer a few succinct remarks upon the mode of collecting and storing this commodity, arranging it on board ship for export, leaving the question of statistics to a future opportunity.

Ice houses vary in size and capacity from two to fifty thousand tuns. Allowing forty cubic feet of ice to the tun, the smaller size mentioned would require internal dimensions of one hundred feet in length, fifty feet in width, and twenty-four feet in hight to the eaves. Houses for ten to thirty thousand tuns are often built in several sections, of these, or even increased dimensions, giving one the idea of half a dozen large barns cemented together at the sides, each section having its own individual roof, reminding one of the board fences one sometimes sees, where the upper edge of the fence is sawn out into pickets, looking like saw teeth. The capacity of the houses is of course determined by the amount of business the proprietor has or anticipates. As a general thing they are entirely clear in the interior, no space being taken up by beams or ties, or anything which would interfere with the regular filling up of the whole space with ice, or anything which can possibly act as a heat conductor in the summer season.

The walls are constructed with a double row of stanchions or studs, the interior ones being perpendicular and the exterior slightly inclined, so that the space between the boarding may gradually diminish from twenty-four inches at the bottom to sixteen at the top. The boarding is put on between the inner and outer stanchions, to secure it from being burst off by the pressure of the filling, and the inner and outer shells are bound together at regular intervals by iron bolts, to prevent them from spreading from the same cause. The space thus left is filled with spent tan preferably, but sawdust may be used, or what are called short shavings. The whole is surmounted by a roof with a steep double pitch, and the building is often whitewashed, roof and all, more perfectly to reflect the rays of the sun. One *sine qua non* is, that all round the foundations the whole building shall be perfectly air tight; not, as one would at first imagine, to prevent the access of air, but to prevent the cold air at the bottom from rushing out, and giving up its place to the comparatively warm air at top, which would endanger the whole stock stored in the house. This, with the requisite doors, and hoisting and storing apparatus, may be taken as the general type of a well-constructed ice house.

Ice houses are constructed preferably entirely above ground; the underground construction having been abandoned, as a general thing, for the reason that during the summer days the earth absorbs the heat of the sun, and does not yield it up at night, so that, continually absorbing heat in this manner, it is believed that the ice wastes more rapidly by underground than above-ground stowage.

When the season has been favorable, and the ice has attained the requisite thickness—the thicker the better—the ice men proceed to work. As horse power is much employed, and as ice less than five inches in thickness will not bear the weight of a horse, in an open winter it is sometimes late before the ice cutters can commence operations. If there is loose snow upon the surface of the ice, this is removed for any desired distance by means of a scoop. A space of 66 feet square, will give 108 dozen cakes. If good, clear ice is reached, the work of marking and cutting commences. If the surface of the ice is in that granular condition known as snow ice, the ice plane is required. Previous to its use the hand plow is run along one side of the space in a straight line, to form a groove, which acts as a point of departure, and regulates the motions of all the implements subsequently employed in cutting the ice.

The preliminary groove having been made by the hand plow, the swing guide marker is brought into use, and, the guide taking the groove, the marker makes a second one parallel with it. Upon turning around at the end of the course the guide is swung over so as to take the groove last made, and on the return trip a third is made. This process is repeated until all the grooves required are made, equally distant from and parallel with each other.

The right ice having been reached, the process of cutting now commences in good earnest. The large ice plow extends the depth of the grooves already made to twelve or fourteen inches. The same operation is repeated now at right angles to the former grooves, and the cakes are ready for separation from each other.

The rows thus cut are slightly bevelled, narrower below than at the top. Before doing this, however, it is necessary to take measures to prevent the water from entering the grooves and freezing therein, thus filling them up. This is done by calking them with snow, and this is done by an instrument called the calking bar, a bar with a broad chisel like end, and so made as to enter the grooves, and drive the snow to the very bottom. The two outside rows having been sawed out, the blocks lifted upon the adjacent ice, and the grooves behind the next row of blocks having been caulked as before, a bar called the breaking bar is used, generally in pairs, to pry the blocks apart, giving double the purchase attainable with a single one. The calking process must be used behind every row of blocks to be separated, else the plow would, on one of our freezing days, prove a Sysiphæan labor, having to be repeated again and again *ad infinitum*. The blocks are now floated, through a channel cut in the ice, to the ice house, which brings us to the storing and packing.

The blocks once arrived at the house, which is, whenever it is possible, built so that the ice can be floated up to it, is then seized by a huge pair of tongs made specially for the purpose, as the cakes are heavy, weighing three or four hundred pounds apiece, and hoisted up at once where they are wanted. The ice is disposed in regular tiers, the blocks being placed as closely together as possible, though no particular pains is taken to fill up the interstices. This proceeds until the house is filled. One of the most important particulars relates to the covering over all. The material preferred before all others is the long pine shavings of the carpenters. These are cleanly, durable, and not subject to decay. are easily handled by a common pitchfork, and may be used for more than one filling of the house. The objection to hay or straw is that it is liable to decay, or becomes musty. Sawdust is disagreeable, from constantly sifting down and covering the cakes of the successive tears, as the upper ones are removed.

The houses being filled, the proprietors await the summer demand for their commodity, or else proceed at once to load up for tropical markets. The ice which is stored commences to melt at the upper tier, and here is where the greatest waste occurs. The resulting water, percolating through the interstices of the ice, reaches the lower tiers, and, finding a temperature below its freezing point, congeals again, cementing the cakes together in the lower tiers so as finally to form a solid mass, if left undisturbed for a sufficient length of time. An ice house in this city was filled, and left undisturbed for four years. During the fifth year the proprietor, finding his stock of ice running low, examined this house, and found that, by melting, the ice had lowered from twenty feet to four feet in hight, and was one solid cake. He was compelled to employ his plows, and get the ice out of it in such pieces as he could; but it carried him through the season.

In the first part of the present paper allusion has been made to the difficulties encountered in the earlier efforts to transport ice to southern and eastern markets. The first cargo was despatched by Mr. Tudor in February, 1806, to St. Pierre, Martinique. He shipped about 130 tons, and of this only five tons arrived at its destination; and this trip was attended with a loss of about $4,500. Details of the different expedients resorted to, to avoid this loss would be interesting, but the mention of one must suffice. On one occasion he purchased several large cases of flannels, and endeavored by winding the pieces in and out around the ice, to protect it from its natural enemy, a high temperature; but this expedient proved unsuccessful. At length, as ice houses were erected, and the correct principles for their construction were gradually developed, it became apparent that the same principles must obtain in preparing a ship to carry a cargo of ice, converting it, in fact, into a floating ice house; and this is the way it is now done.

The first thing is to make an even floor in the hold of the ship, by filling up the furrows, so to speak, each side of the keel, with what sailors term "dunnage," consisting of fragments of lumber or ballast of some kind. This gives a toler-

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ably wide floor for the lower tier of ice, which (the floor, not the ice) is covered with a layer of straw or hay, and this again with a thin layer of coarse sawdust or wood turnings. This allows the water from the melting ice to trickle down, and to be removed by the pumps. But as the space at the bow and stern of the ship is necessarily narrow, and would admit of the packing of but one cake of ice in the extreme parts of it, which would be attended with great loss and waste without any compensating advantages, it has been found necessary to erect partitions, or bulkheads, across such parts of the vessel as its particular model shall render advisable, so that from half to two-thirds of all the available space in the ship shall be occupied by the cargo, equidistant between bow and stern. This done, the ship is prepared to receive her cargo.

Moored at the wharf where the ice is to be delivered, the main hatch is thrown open, and a slide or chute is constructed from the landing to the hatch. Over the hatchway a windlass is erected, the drum extending entirely across it lengthwise. To this are suspended two iron frames intended to receive the cakes of ice from the chute, in such a manner as that, while the loaded one descends, the empty one rises. As the cakes of ice come rushing down the chute, they are dexterously directed by the ice hooks in the hands of the workmen to one side or the other, so as to enter the gigs, which descend with them into the hold. As the lower tier is completed, it is packed all round the sides of the vessel with sawdust. This gives additional space for the next tier, which is wider than the first, as the sides of the vessel recede from the keel; and the tiers, increasing in width until the whole breadth of beam of the ship is attained, are successively packed as described.

In the shipping of ice immense quantities of sawdust are used, so that what the owners of saw mills used to be bothered with to get rid of, now yields them a handsome revenue. It is estimated that the ice trade of Boston alone consumes sawdust, shavings, and rice chaff to the value of $30,000 a year, an item which used to be thrown away.

To deliver a cargo of ice to India involves a voyage of sixteen thousand miles, occupying four or five months, during which the equator is crossed twice; and if one half the cargo is delivered it is regarded as a success. The loss, is, however, sometimes much greater, even amounting to 75 per cent. On shorter voyages, such as the West Indies, and the southern part of the United States, the loss will not often exceed 33 per cent of the amount shipped.

It would seem that ice, costing nothing for the raw material, might be furnished at lower rates than is demanded for it; but when the amount of capital and labor employed, in houses, men, teams, horses, tools, and machinery are taken into the account, together with the greatly advanced cost of every item which enters into the business, it will be at once seen that only the utmost care and the most perfect appliances can render operations remunerative enough to induce capitalists to invest their funds, and allow them to continue thus appropriated.—*Journal of Pharmacy.*

A 6000-pounder Gun.

One of our most successful inventors and engineers has lately patented, and the specification has been published, of an enormous air-gun of 32-inch bore, to throw a 6000 lbs. shot. The bore of the gun is to be upwards of 30 feet long, and the inventor asserts that he can compress and retain air at a working pressure of 10,000 lbs. per square inch. The sectional area of a 32-inch bore is 804¼ square inches, and the total initial pressure would thus be 8,042,400 lbs., or nearly 3,600 tuns. It would, of course, be next to impossible to pump in air fast enough at this enormous pressure to keep up the velocity of the shot, so the high pressure air is to be contained in a huge casing or jacket formed around the bore of the gun, and having the same capacity of say 165 cubic feet. Thus, instead of the pressure being reduced almost to *nil* at the muzzle, the air would have been expanded but two-fold on the discharge of the shot; and if we disregard the influence of rarefaction, and consequent cooling by expansion, and its effect on the pressure, we should have 5,000 lbs. per square inch still left. If we take the average pressure at 7,500 lbs. throughout the length of the bore, we shall have 2,400 tuns exerted through 30 feet, or say 72,000-foot tuns, and this, were the air to follow fast enough, would send a 6,000-lb. shot at a rate of more than 1300 feet per second. As no ordinary valve could be opened quickly enough to admit air under such pressure, and in such quantities, the shot itself forms the valve. The high-pressure air in the air casing or jacket enters the chamber of the gun through ports, like those by which steam enters a steam cylinder. The shot—a short cylinder with hemispherical or pointed ends—is so packed as to close these ports while the jacket is being pumped full. To discharge the gun a little high pressure air is separately pumped in behind the shot, so as to start it on and past the ports, when the stored-up air does the rest of the work.

Although there may be certain practical difficulties in carrying out this scheme, it possesses great interest, and we shall look with much curiosity to its practical realization.—*Engineering.*

To Coat Iron with Copper or Brass.

The copper or other coating is to be melted in a suitable vessel, and a stratum of borosilicate of lead placed on its surface: the iron is then to be plunged into the molten metal, and retained there until a coating is deposited on it. Iron coated with the tin or lead may be treated in a similar manner. Another method of coating iron with copper is to place in a crucible a quantity of chloride of copper, upon which is laid the iron to be coated, and over that a quantity of charcoal. The crucible is then submitted to a red heat and the chloride of copper fused, and a coating of copper deposited on the iron; or the vapor of chloride of copper may be employed for the same purpose. The coating of copper thus obtained, may be converted to one of brass by exposing the sheet of metal to the vapor of zinc in a closed vessel.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Giffard Injector.

MESSRS. EDITORS:—In your paper of the 2d of May, you intimate that the principle of the Giffard Injector is not well understood, and present your readers with an explanation, given by Mr. John Robinson, of Manchester, Eng., as the best elucidation of the puzzle. I am of the opinion that Mr. Robinson himself does not show a very clear perception of the thing. At any rate, he fails to make it plain to any ordinary comprehension. With your permission, I will endeavor to do so myself.

The operation of the Giffard Injector is dependent on the laws both of pneumatics and hydrodynamics, and its secret lies in the fact that under any given pressure aeriform bodies are propelled with a very much greater velocity than liquids. Thus, if we would communicate to water a velocity far above any thing that could be accomplished by hydraulic machinery, let us first convert it into steam, then set it in motion and suddenly reconvert it into water by condensation; the water will retain the velocity of the steam.

To illustrate by example: We have a steam boiler in operation, under 90 lbs. pressure. If we run a pipe from the steam chamber into the boiler, under or above the water level, equilibrium will exist. But if we open the pipe into the air, steam will flow in a jet. I have no means at hand to ascertain the velocity of a jet of steam under 90 lbs. pressure—about 6 atmospheres—but a table before me gives the velocity under one atmosphere at 650 ft., increasing in a constantly diminishing ratio to 1,600 ft. under 20 atmospheres. Perhaps under 90 lbs. a velocity of 1,000 ft. would be a fair estimate. At any rate, I will assume it for the purpose of this illustration.

Suppose now that the steampipe is of just such length and caliber as to contain, under 90 lbs. pressure, the product, in steam, of one cubic inch of water. Remember it is moving 1,000 ft. per second. Suppose again, that it is suddenly and perfectly condensed, and we have a cubic inch of water flowing with a velocity of 1,000 ft. per second. Now if we open an orifice in the boiler below the water level, a jet of water will be projected from it with a velocity of about 114 ft., which is due to a pressure of 90 lbs. If, again, by means of outside machinery, we throw a jet of water of the same diameter with the orifice, and directed at it, with a velocity of 114 ft., there will evidently be equilibrium; because, as pressure and velocity are convertible into each other, the force of the jet will exactly counterpoise the jet seeking to flow from the orifice, and no water will pass into or out of the boiler. But if the jet, by additional pressure, attain a velocity of 115 ft., then the equilibrium is destroyed, and water will pass into the boiler through the orifice.

To recur now to the cubic inch of water in the steampipe, with its velocity of 1,000 ft. per second. How much more easily and rapidly will it penetrate, where even a velocity of 115 ft. is sufficient to overcome the resistance. And suppose, now, that it comes in contact with another cubic inch of water in a state of rest. It will part with half its velocity to the latter, and both commingled, will move on at the rate of 500 ft. Let these two come in contact with other two at rest, and again, the weight being doubled and the velocity halved, they will move 250 ft. per second. Still again, let these four strike four others in a state of rest, and we shall have eight cubic inches moving with a velocity of 125 ft. per second, which, as we have seen, is sufficient to effect an easy and rapid penetration into the boiler. Of these eight, one is the cubic inch that was condensed out of the steam in the pipe, and here we behold it commingling with and carrying along seven others, by which, in fact, it was condensed, with a velocity much greater than that of a jet projected from below the water level of the boiler under the existing hydraulic pressure of 90 lbs.

I have taken for illustration a given amount of steam and water. In fact, however, there is a constant flow of steam, a constant condensation by an uninterrupted stream of water, and an unbroken jet into the boiler.

It may be asked, if the steam jet itself were directed at an orifice in the boiler, would it penetrate? It would not. It must be remembered that force is a product of weight and velocity, and here the weight of steam being so insignificant—it requiring 1,700 cubic inches under the pressure of one atmosphere to weigh as much as one cubic inch of water—the force would be insufficient to penetrate. But it is a very different thing when water moves with so great a velocity.

The principle of the Giffard Injector is applicable to other purposes than feeding boilers. It makes a good pump for shallow reservoirs. It would make a very powerful fire engine. It could be used to drive light machinery, by throwing its jet into a turbine wheel running at a high speed. I have used it to propel a toy boat—not very satisfactorily, however—having a small copper boiler heated by a spirit lamp, and throwing its jet back under the stern.

Nothing has been said, in this discussion, of the construction of the apparatus, nor was it necessary, as I presume that is familiar to all engineers. I have aimed only to develop the principle. It is a very beautiful invention.

Tuscaloosa, Ala. H. S. WHITFIELD.

Size and Capacity of Millstones.

MESSRS. EDITORS:—J. W. H., of Minn., on page 39, current volume, asks if it will take any more power to grind eight bushels of wheat in the same time on a four-feet run of stones than one of three feet. A very practical question, and one that all millers ought to be interested in, as it touches the absorption of power in all mills.

"H. M.," of Minn., page 263, attempts an answer, but gives no proofs. He says; "I think it will take less power to do the work on the four feet stone, as the velocity required to make the smaller stone equal in capacity the larger absorbs a large proportion of the power." If H. M. means that the larger stones absorb a large proportion of the power to do the work given, I agree with him; but if he claims that it is necessary to run a three-feet stone to equal in area of feet a four-feet stone to grind the given amount, then I beg to differ. Example: The usual motion given to a four-feet stone is 180 revolutions per minute, and some run them to 200 revolutions per minute, but I have stated the minimum. Now let us see what figures tell us about the frictional surface or area of face of a 4-feet stone running at 180 revolutions per minute. Area of stone, 1,809·56 inches multiplied by the velocity and divided by 144, equals the area in feet per minute—a trifle over 2,261·94 feet. A 4-feet stone at that motion, with proper power applied, is able to grind 16 to 18 bushels of wheat per hour and do its work well, and many even greatly exceed that amount if their burrs are heavy.

Some millers might ask: "What is the use of running the stones so fast if they will grind 16 to 18 bushels per hour when we only want to grind 8 bushels?" I answer, because experience says that is about the proper motion for a 4-feet stone to run at to discharge the flour and meal properly, the draft in furrow being one inch to the foot.

Now let us see the capacity and friction of a 3-feet stone running at 240 revolutions per minute. The peripheries of the 3 and 4-feet stones would travel at the same rate, but their areas differ greatly. The area of a 3-feet stone is 1,017·87 inches, multiplied by the velocity and divided by 144, equals 1,696·44 feet per minute, a difference in favor of small stones of 565·50 feet per minute. Experience proves that a 3-feet run of burrs, at the above motion and proper power applied, is capable of grinding 10 to 12 bushels of wheat per hour, and do its work well.

Again, if you would grind 16 to 18 bushels per hour on a 3-feet run of stones, it would be necessary to run them to 320 revolutions per minute. Then they would be equal to a 4-feet run, if they are heavy enough; but as a general rule it is impossible to run at that motion, on account of the grain choking in the eye of the stone. Therefore to grind 16 to 18 bushels per hour with one run, the 4-feet run at 180 revolutions is preferable on that account.

A 3-feet burr running at 220 revolutions, with proper power applied, is capable of grinding 8 to 10 bushels of wheat per hour and do its work well; if that is the case, then let us see where we have saved power. The area of a 4-feet stone running at 180 revolutions is 2,261·94 feet per minute; the area of a 3-feet stone at 220 is 1,555·07; difference in favor of small stones of 706·87 feet per minute. What are these extra feet unless rubbing surfaces?—friction. These extra feet cost more in the first place, have to be kept in order, take longer to dress, absorb power, and generate heat, a great detriment to good grinding.

If I have proved that the 3-feet burrs will grind the stated amount (8 bushels), then throw the 4 feet out and save power; if your power is light it will pay. I have one run of 3-feet burs running in my mills at 220 revolutions; it grinds 8 to 10 bushels of wheat per hour, and does its work as well as a larger stone, and saves power. At one time I thought a 4-feet burr just the thing for any power or amount, but experience has taught me differently. Now I use the size of stones and number of runs best adapted to the work and power.

In erecting new and overhauling old mills, the first thing in order is to ascertain the amount of power you have at command; then you can determine the size and number of runs you can use. The next thing in order will be the cleaning and bolting apparatus, ever remembering to have enough. GEO. RULE.

Wheatland, Iowa.

The Moon As an Inhabited Planet.

MESSRS. EDITORS:—On page 280, current volume of the SCIENTIFIC AMERICAN, you have an article under the heading "Lunar Vegetation," which is good as far as it goes, for it verifies to a certain extent the writings of a philosopher who lived nearly one hundred years ago, namely, Swedenborg. He claims that the moon and all the planets are inhabited, and meets the objection "that the atmosphere surrounding the moon is too light to support man," by the answer, "that things are created for their conditions," and that the men of the moon have lungs constructed for their especial needs.

By referring to Swedenborg's work on the "Planetary System," you will gather my meaning as I may not have been explicit enough. A. W. W.

New York.

GENERATING STEAM BY GAS.—Illuminating gas has been employed in England, in heating steam boilers and generating steam for working the hoisting apparatus of warehouses, or other purposes where steam power is only required at intervals of time. With a vertical tubular boiler of three horse power, steam at 60 pounds pressure is generated by twenty-three burners, consuming 100 feet per horse power per hour in full work. The compactness, economy, and efficiency of the gas heated boilers is highly recommended by those who have used them. The first cost and expense of maintenance is small, and the insurance companies have decided to require no heavy risk premiums on buildings furnished with boilers heated by this plan.

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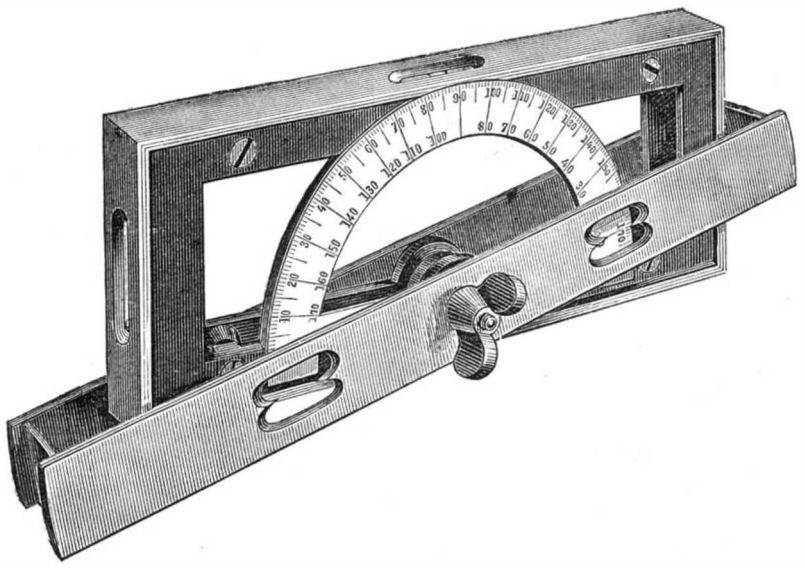
Improved Combination Tool for Machinists and Other Mechanics.

The object of the inventor of this instrument is to supersede a number of separate tools usually required in the shop. It may be used as a spirit level, plumb, try-square, bevel protractor, clinometer, etc., and is adapted to the wants of the machinist, woodworker, draftsman, and surveyor.

The implement is a metallic rectangular frame, having seated in its top and one of its ends spirit glasses for leveling and plumbing work. To the bottom bar of the frame is pivoted a steel frame, held in any position desired by means of a thumb nut. The bolt with which the nut engages is not the pivot upon which the swinging steel frame turns; its object being merely to hold the frame fixed in place. The center of the swing frame has on either side an inward projecting cone fitting into a corresponding recess in the stock of the implement. This gives the frame a large bearing and one always perfectly tight without danger of wearing. A graded semicircle guides the position of the frame, through holes in which the operator can readily see the degree at which he desires to fix the frame. The whole being built strongly of metal, there is very little danger of breaking or wearing out.

It is the subject of one patent obtained through the Scientific American Patent Agency, Jan'y 1st, 1867, and application for another on improvements by A. F. Ward is now pending. All inquiries should be addressed to W. S. Batchelder & Co., Pittsburgh, Pa.



WARD'S IMPROVED COMBINATION LEVEL.

Whitewashing.

A correspondent of the *Germantown* (Pa.) *Telegraph* furnishes the following:

As the house cleaning time will soon be here, it may not be amiss to say a few words in regard to whitewashing. There are many recipes published, but we think the following to be the best that can be used: White chalk is the best substitute for lime as a wash. A very fine and brilliant whitewash preparation of chalk is called "Paris White." This we buy at the paint stores for three cents a pound, retail. For each sixteen pounds of Paris white we procure half a pound of the white transparent glue, costing twenty-five cents (fifty cents a pound). The sixteen pounds of Paris White is about as much as a person will use in a day. It is prepared as follows: The glue is covered with cold water at night and in the morning is carefully heated, without scorching, until dissolved. The Paris White is stirred in with hot water enough to give it the proper milky consistency for applying to the walls, and the dissolved glue is then added and thoroughly mixed. It is then applied with a brush like the common lime white wash. Except on very dark and smoky walls and ceilings, a single coat is sufficient. It is nearly equal in brilliancy to zinc white a far more expensive article.

A Locomotive struck by Lightning.

On Friday last, during the hail storm that visited this section, the eastward-bound train on the Toledo, Peoria and Warsaw Railway, George Boies, conductor, and C. A. Martin, engineer, had just left El Paso when the storm struck it. When about a mile and a half east of that city, the lightning struck a telegraph pole. Instead of shattering it and going to the ground, it burst the insulator, making a blaze of light, passed on the wire to the next insulator, and burst that, with another blaze of light, as intense, a looker-on informs us, as a thousand gas jets, and so on for five poles. It then ran down one pole and leaped to the track, and ran back without doing any damage until it struck the engine. It ran up one of the drivers, and burst a section of two feet out of the solid tire, and passing along the boiler, without doing any damage, it reached the lever and went upward with a blaze of light similar to that on the telegraph wire, and with a detonation like a small cannon. So intense was the light, and so violent was the shock, that the engineer was nearly blinded, and almost stunned. Our informant says that the appearance of the light on the track was brilliant beyond conception. It looked as if there was an immense lake of fire ahead, into which the train was about to plunge, and the contrast between the light and the ordinary daylight that followed seemed as great as that between the brightest day and the darkest night.—*Peoria (Ill.) Paper.*

Venom of Toads.

The toad, formerly considered as a creature to be feared, does in reality possess a venom capable of killing certain animals and injuring man. The *British Medical Journal* says that this poison is not, as in generally thought, secreted by the mouth; it is a sort of epidermic cutaneous secretion, which acts powerfully if the skin be abraded at the time of contact. Dogs which bite toads soon give voice to howls of pain. On examination it is found that the palate and tongue are swollen, and a viscous mucus is exuded. Smaller animals coming under the influence of the venom undergo true narcotic poisoning, soon followed by convulsions and death. Experiments made by MM. Gratoilet, Cloez and Vulpian, show that the matter exuding from the parotid region of the toad become poisonous when introduced into the tissues. A tortoise of the species "Testudo Mauritanicao," lamed in the hind foot, was completely paralyzed at the end of fifteen days; and the paralysis lasted during several months. Some savages in South America use the acid fluid of the cutaneous glands of the toad instead of the curara. The venom exists in somewhat large quantity on the toad's back. Treated with ether it dissolves, leaving a residuum; the evaporated solution exhibits oleaginous granules. The residuum contains a toxic power sufficiently strong, even after complete desiccation, to kill a small bird.

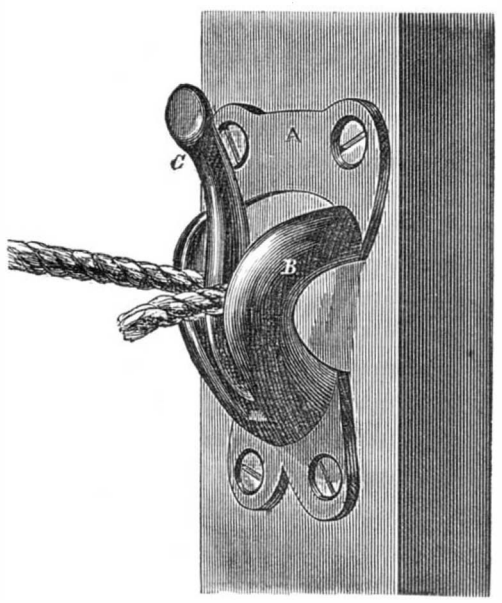
Weldless Steel Tires.

Weldless steel tires are now manufactured in England by rolling. The mill which is used for this purpose consists of two sets of rolls supported by the same framework, but each set working independently of the other. Hydraulic power is employed to press the rolls together. The first set of rolls consists of a single pair. The operation of making a tire consists in placing a hammered ring containing enough metal to form the tire between the first pair of rolls in such a way that the ring incircles one of the rolls. It is then enlarged by rolling, and its section formed in the same manner as a straight bar would be drawn and shaped in ordinary rolling mills.

The second set of rolls is similar to the first with the addition of two side rolls mounted upon a pair of jaws which can be opened and closed by toothed segments operated by a worm having a right and left-hand thread. These rolls finish the tire. Seventy to eighty horse-power are required to drive this mill and the entire operation is completed at a single heat. The same process has been in use for years in this country in the manufacture of weldless iron tires.

GLADDING'S CLOTHES LINE HOLDER.

The engraving shows a neat device for securing clothes lines to any support without the necessity of tying or knotting. It allows the line to be attached or detached instantly, and is adapted to hold not only the ends but to support the line at any intermediate point. It is a simple frame, A, of



cast or malleable iron, with two bows, B, spreading from the bottom up, and having their inner surfaces beveled from the outside inward. Between these is a tongue, C, pivoted at the bottom end and shutting in between the jaws, B. This tongue is also beveled, its lower edge being the thickest.

In use the line is passed over the tongue or looped in between the jaws, and the tongue pressed upward and backward, the bevel of the jaws and tongue firmly holding the line, which can be removed only by depressing the tongue by the hand, thus disengaging the line.

A patent for this device was obtained through the Scientific American Patent Agency April 28, 1868, by James W. Gladding, who may be addressed for state rights, etc., at Normal, Ill.

Deficiency of Mechanics in California.

There seems from all we can gather to be a great dearth of mechanics in California. Wages are ranging at from three to four dollars per day in gold for carpenters, and it is said that at least one thousand more might at once obtain employment there. There is a scarcity of hatters, shoemakers, machinists and workers in all branches of mechanical art. Ten thousand mechanics, it is stated, would readily find employment. Much of the machinery used there is made in England and eastern cities of the United States. Leather is sent to Philadelphia and elsewhere to be made up and returned. It would seem from these statements which are gathered from California papers, as though many young men might better themselves by going there. We understand rates of passage are extremely low this season from New York to San Francisco, on account of the strong opposition existing between the lines of steamers which run between the two ports, via Nicaragua and Panama.

SCARCITY OF FIRST CLASS WORKMEN.

The abolishment of the system of apprenticeship in this country, and the introduction of planers, engine lathes, and other labor saving machines into the machine shops has produced a scarcity of good workmen. The effect of the former has been to encourage a class of half trained mechanics, who, having gained sufficient knowledge to enable them to perform certain kinds of work, and at that to obtain living wages, are content to remain without further effort at improvement. The introduction of machinery to perform what was formerly done by hand has obviated the necessity for that skill in manipulation and nice training of the eye, which in former times were essential for all kinds of work. It is a common thing to find men who can attend a lathe, or run a planer, who are utterly incapable of doing work with a file, and who, if they were set to constructing any machinery requiring nice fitting throughout, would utterly fail. The exceptions to this are rare, and we are afraid they are becoming more so. Mechanical engineers are frequently troubled to find workmen who can properly execute their designs. Especially is this so where new forms are introduced into machinery, when a general lack of resources and expedients will most probably manifest itself. We know of one engineer who could only find at the third trial a shop where he could get work done to his full satisfaction.

We feel satisfied that the training of the eye, in which most deficiency is probably found, owing to the substitution of engine lathe work for hand turning, and planing for the old time chipping and filing, might easily be obtained by practice in drafting, which demands both skill of hand and eye, and to most mechanics would be found a pleasant recreation as well as a valuable accomplishment. At a future time we may say more on this subject.

A New Era in Steam Navigation.

A company has just been formed in New York city, and the necessary capital paid in, for the immediate construction of a new steamboat, 216 feet long, specially designed to run *forty miles an hour*. The boat is to be operated on the plan patented by Stephen I. Gold, a man of science, the inventor of many valuable improvements, among which are Gold's steam-heating devices, now very extensively used. His present invention consists in a new mode of applying steam power to the paddle wheels, by which he is enabled to make use of machinery having great effective force, with but little weight. This results in a reduction of the immersed cross section of the vessel, and a consequent increase of speed over ordinary boats. The new vessel is to be provided with 25-horse power for each square foot of immersed cross section. If this enormous force can be successfully applied to the paddle wheels, the vessel must move at the intended velocity, or something will break.

It has been ascertained that about 1-horse power per square foot of cross section will move a boat at the rate of 10 miles an hour; 4-horse, 20 miles; 16-horse, 40 miles; 64-horse, 80 miles, and so on. But up to the present time no engineering skill has been able to devise a method of augmenting the driving power without also increasing, proportionately, the area of the immersed cross section. Although we have many large and powerful boats, they do not travel much faster than the smaller craft. The fastest of our river boats, such as the *Mary Powell*, *Bristol*, and *St. John*, have between 3 and 4-horse power per square foot of immersed cross section, and they run from 16 to 21 miles an hour when not affected by wind or tide.

We heartily wish success to the projector of the new boat, and to the enterprising gentlemen who have united to furnish the necessary pecuniary assistance. Whatever the final result, the project is most laudable, and cannot fail to be fruitful in engineering experience.—*The Wheel.*

A SUB-AQUEOUS ENTERTAINMENT.—Boston, capital of the land of notions, proposes to introduce into its 4th of July celebration this year a new feature—a submarine race, or walking match under water. The distance is a mile, from Long wharf to the Cunard wharf in East Boston, and it is proposed that three practical submarine divers shall enter the race. A wag says this is a plan of the cold water men, who wish to show what can be done in their favorite element.

BLACK VARNISH FOR IRON WORKS.—Dr. Lunge distils gas tar until nearly all the volatile products are got rid of, the residual pitch being then dissolved either in the heavier oils, or, if a quick drying varnish is required, in the light oils or naphtha. The advantages of varnish so prepared over the original tar, is that by the above process we get rid of the ammonia, water, carbolic acid, and other constituents that give to tar its disagreeable odor, and make it so long in drying.

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THE WATCH---ITS HISTORY AND MANUFACTURE.

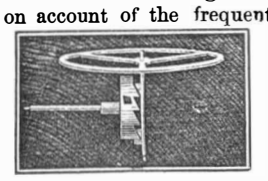
BY H. F. PIAGET.

No. 4.

MERITS AND DEFECTS OF THE WATCH.

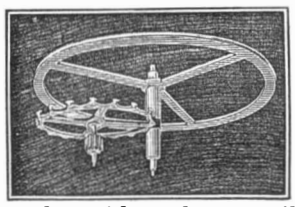
The Vertical or Verge Watch.

The vertical or verge watch requires to be made thick, but on account of the frequent expense of a new verge which will wear from continual friction and action of the escape wheel on the pallets, also from the fashion of wearing flat watches, there are but few verge watches worn now, and those that are made are generally of an inferior quality; but there are still some few good ones, and when in order, will keep tolerably good time.



Horizontal or Cylinder Watch.

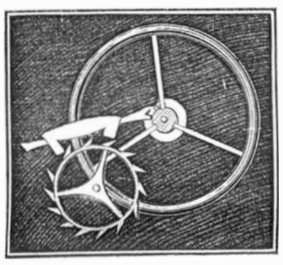
The horizontal, or cylinder watch, has the impulse given by the teeth of a horizontal wheel acting on a hollow cylinder, which forms the axis of the balance.



The horizontal or cylinder watches, when well made, will perform with considerable accuracy, and if not suffered to go too long without cleaning, will continue serviceable for many years. There is, however, much friction in the escapement, and a great wear takes place if they are allowed to continue in motion after the oil has become dry. When they commence varying more than two or three minutes a day, they should be submitted to the inspection of a good watchmaker, and cleaned if necessary. If they have been recently repaired, it may be only the oil that is worn off the cylinder, and by putting fresh oil to it the watch will frequently regain its motion and perform for some time with accuracy if it was well made.

Patent Detached Lever, or Anchor Escapement.

I find there is a mistaken idea about this escapement, and that its action is but little understood in this country. I shall endeavor, however, to explain this escapement, and its action, in such a manner, that every reader can understand them.



Nearly a century ago, the first lever escapement was invented as an improvement upon the verge, vergule and horizontal then in use. The lever was first made with a rack placed on the pallets, where the fork or lever now is. This rack acting with teeth or cogs, on a pinion, as an axis to the balance. (See engraving of balance and axis.)

By this means one wheel to the train was saved; the escapement wheel acting as the seconds wheel, but that arrangement not working well, another wheel was added, and is continued to the present time. The continued friction of the teeth of the rack upon the pinion, caused a magnetism in them, so that to keep the watch in running order it became necessary to frequently apply oil to the affected parts, and this had to be remedied.

There are yet many of the old rack levers in use, both with and without the extra wheel. They are generally found in the old fashioned double cased watches that we meet with occasionally. I have altered several in this country, which can be done by putting in a good fork or lever, instead of the rack and by making a new staff or axis, with a table or roller for the ruby pin. In some cases it is necessary to make all the escapement new, especially in very old styles.

Messrs. Roskells, of Liverpool, England, were, I believe, the first to obtain a patent for the detached lever escapement, the difference being that instead of a rack, a fork or lever was attached to the pallets or anchor (so called by the Swiss), and instead of a pinion to the balance, as an axis or staff, have a plain staff made, with a roller and ruby pin as at present. (See plate of lever escapement.) The lever or fork having the impulse given to it from the wheel, and then striking against the ruby pin gives the motion to the balance from which it was disengaged, till brought back by the hair spring, the ruby pin then strikes the fork, and disengages the wheel, thus allowing it to go on.

This causes the two distinct beats we hear in a lever watch. This improvement being patented, watches constructed on this principle were called patent detached levers, and in this manner originated the detached lever.

This patent obtained in England first for seven years, was afterwards renewed a further term of seven years, at the expiration of which period a further renewal was refused, and detached levers were then made by nearly all the watchmakers, it being far superior to the rack lever and all others commonly made at that time, chronometers excepted.

The horizontal, however, continued, and is still made, but when it was desired to make a very good watch, it was made with ruby cylinders, this, however, was more expensive than a lever.

I well remember the time when a detached lever was very scarce in England, and quite unknown in Switzerland. Some few years after the Swiss commenced making them, and finding the fashion was for flat watches, they made them on the plan of the lepine movements, (see plate) instead of the clumsy-looking old fashioned lever, but without the fuzee. By this method detached levers could be made much thinner and smaller, and thus constructed, they were named anchor watch.

It was about this time, that the double power watch was first introduced, (as described in another part.) It was made absurdly thin and small; but that style did not continue long, as it was found to be too great a tax on the patience and eyesight.

The anchor watches were also made with full and half plates, to make them pass for English watches, but the makers finding that the name of anchor was not well understood, called such watches detached levers.

Now, I wish my readers to understand, that a patent or detached lever, and an anchor escapement, in the principle of action are precisely alike, the name anchor being used by the Swiss, for what the English call pallets.

The lever is called the same in both countries. American watches have an anchor escapement, yet are called patent detached levers.

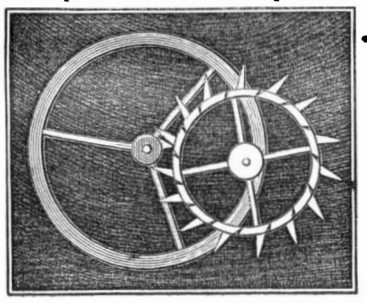
The English watch has a patent detached lever escapement yet it is an anchor. The Swiss have an anchor escapement yet it is like both the above, in action and principle, and in whatever form these watches may appear in your eyes, they are the same in action.

There have been many improvements made in lever watches of late years, particularly in Swiss watches, one of which is, the straight line, to which I give the preference; this improvement is now adopted in the best American watches. I doubt if many more improvements can now be made to this escapement, as I believe perfection has been nearly reached, still I may be mistaken, as nothing seems certain, except taxes and death. These escapements have stood the test fifty years, and unlike many others, (the chronometer excepted) have not been found wanting, but have continually improved in quality, still after all it is the detached lever at the root. Therefore, remember, and if you are puzzled, read this part over again. If you get an English patent lever, an American watch of any make or quality, a Swiss detached lever, or a Swiss anchor watch, you are getting the same kind of escapement, although they are constructed in innumerable styles, yet I repeat the principle is the same. If there is any choice get a straight line one, and if well made, and with an isochronal hair spring, I think you will be satisfied. Should I attempt to describe the different shapes that are made, it would fill the paper with a mass of matter, that would be useless to the general reader, for whom this is written.

The technical names are to be found in larger and more expensive works than this; prepared for the use of manufactnrers. For to know all things well, we should know them in detail, and as that is in a manner infinite, our knowledge becomes almost superficial and imperfect.

Duplex Watches.

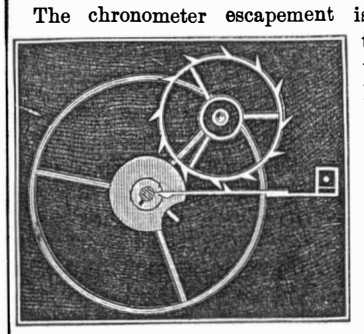
A duplex watch with a compensation balance, when well constructed, will, with ordinary care on the part of the wearer, keep time with the greatest accuracy. These watches are, however, delicate, and should not be worn when violent exercise is intended, such as riding on horseback, jumping, etc.



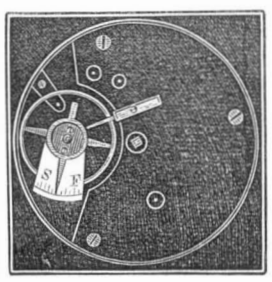
Another reason is, except that in large cities, there are but few workmen who understand the principle of this escapement properly, and who can repair them as they should be. A bad watch on this principle is (the chronometer excepted) worse than any other, and more expensive to correct and repair.

Chronometers.

The chronometer escapement is the most perfect for the measurement of time, and one with the least friction. It is the only one that is employed in marine chronometers. The term chronometer is applicable to all timekeepers, but it is now more usually applied to marine timekeepers only; those being large, their several parts approaching in size to those of a small clock, require less delicacy of workmanship than pocket watches of the same construction. The high office which marine chronometers have to fulfill, demands an accuracy far beyond what can be attained by a machine as small as a watch. A marine chronometer is always in one position, being placed in two boxes made and fitted in such a manner that whatever the rolling or pitching of the vessel is, the dial is always uppermost, which accounts for its accuracy, and which could not be obtained in a watch, as no matter how well the escapement is made it will be liable to set or stop by some external motion.



Half and Three-quarter Plate Watch.



Some watches are made with the half and three-quarter plates on the English principle, with chain and fusee. The idea first originated with Mr. Dent. The balance is there placed at the side instead of being in the middle of the upper plate as in ordinary watches. By this arrangement they are enabled to make them considerably thinner. They are made with cylinder, lever, duplex, and even chronometer escapement. They sometimes have a cap, and open from the front, like other capped watches, but I prefer them without the cap, and to have the case made to open similar to most of the Swiss watches, as otherwise they are more liable to accidents in opening the movements or caps. If well made, they are equal for timekeepers to those on the old plan, and not more liable to get out of order.

Swiss watches are sometimes made on this plan, but they are usually without the fusee, but either kind will perform well if properly adjusted.

The Lepine Watch.

The watch usually called Lepine, was made in Paris about fifty years ago, and I believe that Lepine, a celebrated maker at that time, was the inventor, from whom they are so called. The object of having the wheels held by bars and screws, which any person having opened one has seen, was to make the watch flatter than the English could make theirs. Breguet, the celebrated maker of Paris, made all his flat watches after that fashion. He was also the inventor of an improved manner of fitting the going barrel on the bar of the ratchet, and also of the key named after him, to prevent winding the watch the wrong way.

Watches made now in that style are frequently called Lepine Watches, although they are made with every kind of escapement. Like the half and three-quarter plate, if they are well made, the bars properly fitted, and the spring well adjusted, they will go equal to any other kind of watch made without a fusee, with the same escapement, except the chronometer, which requires more solidity than there is usually to this kind of watch.

The Chinese, or Center Seconds Watch.

The center seconds or Chinese watch is so called on account of first being made for China, so that they could see the watch go plainer than by having a small seconds hand. They are made with the duplex escapement, and having a very large balance. The inner back of the case is generally glass, through which all the works can be seen. The brass works are ornamented with engraving, which with the bright and blue steel screws, has quite a showy appearance. I have seen many with the plates made of steel, and all the other works in all kinds of variegated colors, to make as much show as possible. Thirty-five years ago I worked on them altogether, and I see no difference with those now made. I cannot recommend them strongly as time keepers, in particular now when they are made so cheap. One very great fault about them is, that the beat is too slow, beating a second at a time. It having been ascertained by practice and experience, that quick motion watches regulate better than slow ones, and are not so likely to be affected by external motion.

The Chinese always had them made in pairs, and every part, even the screws, had to be so exactly alike, that you could not tell one from the other, only by the numbers of the watch; even in regulating, the hands of both watches had to move together. The reason was that the Chinese wore two watches, which they carried in a pouch or pocket, fastened on each side. They say when a watch stops, it is dead, and cannot be set going again, and if one stops, they still have the time by the other; but if they both stop, they get others, as they never think of having them repaired. I suppose this idea originated with them on account of not having watchmakers convenient to repair them.

Independent Seconds Watches.

Watches with a long second hand in the center were made many years ago chiefly in England, for the use of physicians, and persons wanting to measure time very accurately. But they did not move one second at a time, their motion was only as the vibration of the balance was one third of a second at a time. By further improvement, they were made to beat one second, but still there was a great defect, as in the Chinese watch; when you stopped the seconds, you had to stop the going of the watch altogether, and thereby lose the time. As a further improvement, you can stop the long seconds hand in the center without altering the regular time, and see when or at what time you stopped them. They are made, now that there are two separate trains of wheels, two springs, and two sets of hands, by stopping the center seconds, which is done by a piece placed outside the case; you stop one set of hands while the others keep going, and you still maintain the regular time. When you wish to set them again together, you do it by a square at the back of the case, without any injury to the watch, nor does it interfere with the regular time, as they are independent of each other, more particularly when the center seconds are stopped. For those interested in an operation performed in small portions of time, some being made to show one fifth of a second; these are very useful, such as timing horses, etc. With the assistance of a seconds watch, and some slight calculations, many interesting facts may be ascertained. If a gun be fired by a vessel at sea, the distance may be known by observing the number of seconds which elapse between the flash and the report. In mild weather, sound travels at the rate of 1123 feet in a second; if therefore the report of the gun was heard five seconds after the flash had been seen, the distance of the observer from the gun would be 5615 feet, or rather more than a mile. This

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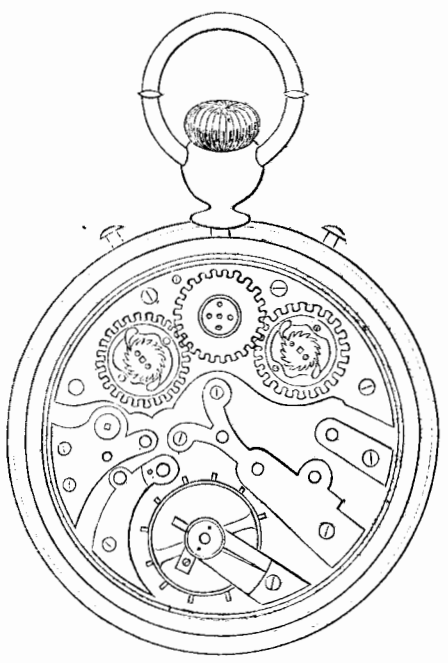
is merely approximation, for the velocity of sound varies according to the density of the atmosphere. In dry frosty weather, sound travels at the rate of only 1080 feet per second.

A person traveling may ascertain his rate of walking by the aid of a slight string, with a piece of lead at one end, and the use of a seconds watch. The string should be knotted at distances of forty-four feet; this distance is the 120th part of an English mile, and bears the same proportion to a mile that half a minute bears to an hour. If the traveler when going at his usual rate drops the lead, and suffers the string to slip through his hand, the number of knots indicate the number of miles he walks in an hour. This is similar to the log line for ascertaining a ship's rate at sea; the lead in this case is enclosed in wood, (from whence the name) that it may float; the divisions are called knots, and are measured for nautical miles. Thus, if ten knots are passed in half a minute, they show that the vessel is sailing at the rate of ten miles or knots in an hour. A seconds watch would here be of great service, but the half minute sand glass is in general use. The use of a seconds watch is indispensable to a physician, to enable him to ascertain correctly the duration of spasms, convulsions, pulsations, etc. With the aid of a seconds watch, a person can count his pulse when in perfect health, and ascertain the number of beats in a minute; this would enable him to let the physicians know (when necessary to consult one) how much the pulse differed from its usual rate, otherwise it might happen to a person whose pulse was naturally quick, to have remedies prescribed to diminish the rapidity, which under these circumstances would be injurious. Independent seconds watches if properly made, are no more liable to get out of order, than those that have only one second hand, but they must be carefully used.

Since my first edition, a great improvement has been made in these watches. Those made at that period were not so good as those made at the present time.

Quarter and Fifth Seconds, and Pendant Watches.



These watches were used principally for "timing" at races, etc. By their use the time can be taken to a great nicety. This is done by means of a small thumb piece, at the side of the case, which either starts or stops the one quarter or one fifth seconds instantaneously, without disarranging the true time of your watch, no matter how often you stop or start it.

It is a great improvement to the old-fashioned watch with which you could only time to one second, besides not starting nor stopping so quickly, neither being so detached from the going part of the watch, as by the present mode.

Another advantage over some old kinds, is having only one set of hands to set.

The Pendant Winders are very useful in not requiring a key to wind them up or set the hands, and they have also lately been much improved. When the hands are being regulated it is not necessary to open them, thereby preventing small particles of dirt from getting into the movement from the key or winding-up holes. Both of the above are made in different ways, some watches have only the pendant winding arrangement added, while others have both the winding part and the seconds added to the going part. No one need be afraid that it will disarrange the time part; it will not interfere with it. (See engraving of pendant watch,)

The winding is accomplished by means of a fluted knob at the end of the pendant, which is furnished with a click work, so that it is impossible to wind it the wrong way, it working similar to the old-fashioned "Breguet" or click keys. Where the watch has the independent seconds, which requires two movements to be wound up; by turning one way, you wind the watch or time part, and by turning the other way, the seconds part is wound up. In the engraving these pins are represented; one is used to start or stop the seconds, and the other to set the hands, which is done with the same knob at the pendant; this represents a fifth seconds watch.

Where there are no independent seconds, there is only one pin at the side, but the arrangement of the pendant is the same. In the plain watch there are only two wheels connected with the winding part, while in the "Seconds" there are three, as represented in the engraving, for the purpose of winding both springs.

Be very careful if you purchase a "Winder" to get one of good quality, for if the winding part is not well made, and gets out of order, it is difficult and expensive to repair. If you get an inferior quality, you had better get a watch to wind with a square and a key. I have had several common ones to alter from winders to the old-fashioned square and key. This is done by making new barrel arbors, etc. With a well made watch of this kind, there is no more danger of its getting out of order than by the old method of winding.

These watches are certainly very handy, for wherever you may be there is no occasion either to open your watch, or fumble for the key. Be careful if the watch winds too hard to have it attended to immediately by a competent watchmaker. The difficulty in winding sometimes occurs through want of oil on the winding wheels, these being made of steel require oil to prevent too much friction. Should you force the wheels, some of the cogs or teeth may be broken, or injured, and it will then be difficult to replace them, especially in country places.

Most of these remarks apply to the fifth or quarter seconds, purchase of the best quality, and of well-known and respectable makers, of which I know several who would not allow an imperfect article to go out of their establishments. The possession of a watch of inferior quality, either quarter or fifth seconds, or pendant winder, will be a continual source of trouble and expense.

When your watch requires repairing or cleaning, be careful to put it in competent hands, for these watches, like chronometers, repeaters, and duplex watches, are not to be trifled with. Being complicated in their construction they are easily spoiled by persons who do not fully understand them. Should you require a cheaper or less complicated watch, read my remarks on other kinds, and make your selections according to your taste and means. I feel certain that if you follow my advice in this matter, you will be pleased with the choice you make.

Remember that a little neglect may breed great mischief. There is an old story that runs something like this: "For want of a nail the shoe was lost, for want of a shoe the horse was lost, and for want of a horse the rider was lost, for he was overtaken and slain by the enemy." All this misfortune through neglecting to have a nail put into a horseshoe.

Repeating Watches.

Repeating watches are expensive both in the first instance, and in the subsequent repairs, and the same objection may apply to them as to the chronometer and duplex watch—that is, the difficulty of getting them repaired. They are, however, a luxury to those who can afford them, and are as capable of accurate performance as ordinary watches of the same quality, the repeating part not in any way interfering with the general works of the watch. Minute repeaters are difficult to execute, and uncertain in the continuance of their proper actions, as the small space afforded in a pocket watch is insufficient for the greater number of pieces. The same may be said of musical watches now nearly out of date. These watches are principally valuable as specimens of art. The musical and repeating watch together as they were made, may be fairly regarded as one of the triumphs of mechanism, which unfortunately can only be appreciated by a watch maker. The apparently complicated notion of a Jacquard loom, when seen may be understood, for although composed of innumerable pieces, yet it has to repeat but few actions, which on being seen are easily understood.

Much ingenuity is required for the construction of engines of various kinds, but frequently the first element of mechanics are sufficient to produce them, while in their execution space can generally be obtained, and power produced at will. But the complicated motions of a repeating watch requiring to be produced in so small a space, and with such perfect accuracy, must be considered as one of the highest specimens of mechanical art. The writer when he first arrived in New Yoek in 1832, had with him a repeater with duplex escapement; this watch was made by himself, each separate part having been made as he had learned the different branches. He brought it for the purpose of having a specimen of his work. The first watch which he repaired was a musical repeater, which had lain by some time, on account of the want of workmen to undertake it. It was given to him by Mr. S. W. Benedict, Wall street, to ascertain if he really understood the construction; he succeeded in putting every part in good order. They have now become nearly extinct, and he has had but few of that kind of watch to repair since that one, although he frequently has repeating watches to do.

Alarm and Clock Watches.

Alarm and clock watches lose their effect from the ear becoming accustomed to them. More noise in striking is generally required than can be produced by a watch, while useful alarms and clocks can be had at much less cost. The writer, when apprenticed, worked at a watch in London, made for Arnold, which contained a clock that struck every quarter of an hour, and repeated the hours and quarters also at pleasure, and an alarm, all striking on different spiral springs. Thus with the watch part, it had four distinct sets of wheels and springs, and the escapement, which was a Duplex; it had also five spiral springs for the striking. Although the size did not exceed that of an ordinary English watch, the cost when finished in gold cases was four hundred guineas (two thousand dollars). But few such watches were ever made, neither ought they to be.

Double Power Watches.

About thirty years since there was a great demand in England for flat and small watches, but the difficulty was the want of power to the spring. After a great amount of labor, my uncle succeeded in inventing a movement with two barrels and two springs, both winding by only one square at the same time, hence the name of this watch. The invention he sold to Messrs. Dwerrihouse, Carter & Co., of London, who patented it. For many years after they were all the fashion, as by this plan English watches could be made as thin as Swiss, and perform better. They being very expensive, and the patentees having a store for retailing in the best part of London, found customers for all they could make—therefore they were not made for the trade, nor for exportation. This is also the case with the watches made in Paris by many of the celebrated makers, such as Breguet, Le Roy, Lepine, and many others, having made but few and at great expense, they are only found in the possession of the wealthy.

Watches of Fancy.

Watches of fancy, such as those showing the hour through a dial, changing with a start, were absurd, and should be used as toys only—they are now out of date. Some very good watches are made to mark the days of the week and month. There is frequently much skill and ingenuity displayed in their construction, but the purposes can better be accomplished by a well made clock of sufficient power. Fancy has certainly placed watches in most inappropriate places—in the lids of snuff boxes, in shirt studs, breast pins, etc. The Elector of Saxony had a watch in the pommel of his saddle. The writer worked at the making of a repeating watch for George the Fourth (who was a great patron of the art), to be worn on the finger ring; he had a cabinet containing specimens of every kind of new watch produced, and used to amuse himself by keeping them going, to see which performed the best. Watches made for ladies' bracelets may however, be so constructed as to be serviceable. I might describe other kinds of watches, such as those that wind up and set the hands by the pendant. Repeaters which strike the hour on a pulse piece at the side of the case for the use of the deaf; others with the figures raised on the dial, for the use of the blind, but as most of these watches are extinct, it will be useless to describe them.

American Watches.

This watch recommends itself for the simplicity of its construction, and will be continually improving in quality, if the manufacture remains in the hands of persons who will make it of a good quality, without regard to price. In case of accident it is easily repaired. But I would suggest to any of my fellow craftsmen having them to repair, to be particular to use none but the very best main springs, should new ones be required for them. There are many manufactories of watch cases, dials, etc., in this country; in fact, any part or parts of a watch can be made here, and by applying to any good watchmaker, he will make them or get them made.

MANUFACTURING MINING, AND RAILROAD ITEMS.

A report of the Connecticut Railroad Commissioners, just submitted to the Legislature, represents the condition of the several roads in the State to be in a high degree satisfactory. A large increase in passenger traffic the past year is noted, the aggregate amounting to an excess of nearly a million and a quarter over the previous year. The whole number of passengers carried over the various lines was only a trifle under seven millions, with the loss of but one life by any casualty. Few States can show so clean a record and this fact speaks well for the management of the roads in the "land of steady habits." The gross earnings show an increase of over half a million dollars as compared with the previous year.

The United States Geological survey of Nebraska demonstrates the existence of extensive deposits of coal west of the Mississippi, on the lines of the projected railways to the Pacific. In the Laramie plains, the coal beds are from five to eleven feet in thickness, and occupy a basis of about five thousand square miles. Along the eastern base of the mountains in Colorado north of the Arkansas river, beds of solid lignite, or coal of more recent formation than either anthracite or bituminous, extend over many thousand miles of territory. These beds are the remains of extinct forests, and the forms are still distinguishable of oak, hickory, linden, maple, buttonwood, poplar, and magnolia trees.

At Ferry Hill, near Birmingham, Eng., is a new iron manufacturing establishment, which has nine blast furnaces just finished, and about commencing operations. Of these, seven are 82 feet high by 22 feet diameter, and two measure 105 feet in hight and 28 feet in diameter. The supply from these monster furnaces, it is estimated, will amount to at least 180,000 tuns of pig iron annually.

During the present month, the famous Mount Cenis railway is promised to begin operations, for although we have no reason to doubt that the trip over the mountain, so graphically described by our exchanges, and reprinted in our columns some months since, actually took place, there has been some hitch somewhere, preventing the satisfactory operating of the railroad. But every arrangement now having been made, the announcement is made on the best authority that trains will run regularlarly before the close of this month. Twelve new engines have been ordered of Gouin & Co., of Paris, and seven of them, at last accounts, were at St. Michel ready for action. We await with interest for news of the successful working of the road.

The value of the yearly product of the scale establishment of Messrs. Fairbanks, at St. Johnsbury, is now over $2,000,000. The consumption of iron at the factory averages fifteen tuns per day, while there is a yearly demand for nearly two million feet of lumber. Four hundred men have found employment, and one thousand scales, large and small, are sent out from the establishment every week. From twenty to thirty per cent of this product is exclusively for foreign countries, excluding France, Spain, Germany, Turkey, China, and all the South American States, and curious it is to compare the divisions and symbols of graduation peculiar to these nations, which are marked on the scale beams of each.

The vast empire of Brazil boasts of but a single coal mine in working order, almost the entire supply for the imperial and merchant navy, gas works, railways, private and industrial purposes being derived from England. One of the great steam lines running to Southampton has a depot on an island in the Bay of Rio Janeiro, and here resort the steamers of all the English, French, American, and Brazilian lines plying to the ports, to obtain their supplies. Coal forming such an important article of importation, such places as Cardiff and Newcastle are placed in the first rank of ports which maintain commercial relations with the capital of the Brazilian empire.

By a new and simple process invented by a gentleman of Pottsville, Pa. rolled iron of any kind, rails, rods, bars, and sheets are produced from the ore with only one heating. The apparatus consists essentially of a series of vertical retorts with movable bottoms communicating with a puddling chamber. The retorts are charged with the broken ore and charcoal, and the molten iron, after reduction, is drawn off into a puddling chamber where the surplus carbon is burned out, and the metal is piled into balls for the rollers. The fuel used in the operation is anthracite coal, through which a blast of steam is driven; the vapor of water is decomposed by the heat, the hydrogen, released, gives out an intense heat, and the liberated oxygen powerfully supports the combustion.

Black oxide of manganese has recently been found in great quantity in a mine on the Coast range of mountains in California. Several hundred tuns are ready for shipment at San Joaquin City.

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Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

SEAT FOR VEHICLES.—Lewis Pray, Portland, Me.—The object of this invention is to provide a movable folding seat for buggies and other light vehicles where it is frequently desirable to economize space.

FURNACE.—T. J. Leigh, London, England.—This invention relates to certain improvements in furnaces, and in effecting the combustion of fuel therein, whereby several advantages are obtained over the ordinary furnaces in use.

AUTOMATIC CROSS-FEED FOR LATHES OR BORING MACHINES.—Lewis Griscom, Mahanoy Plane, Pa.—The object of this invention is to accomplish the cutting of tapers on shafts and the boring of the corresponding tapering hole for the reception of the tapered shaft in a simple, accurate, and automatic manner.

FRUIT BUTTER STIRRER.—M. G. Collins, Baltimore, Md.—The frame which supports the stirring apparatus, and to which the lids are hinged, is attachable by thumb screws to the rim of the kettle. The stirring devices consist of a crank shaft, bevel pinions, and a vertical revolving shaft with arms.

CAR AXLE BOX.—A. H. Nathans and M. Thornton, Macon, Ga.—This invention is an improvement upon the axle box patented by D. H. Dotterer, April 3d, 1866, and consists in so constructing the spring packing plate used in his invention, that the oil cannot escape from the box, whereby the value of the whole device is greatly enhanced.

PLOW.—Thomas P. Warren, Norfolk, Va.—This invention relates to the plow patented by Warren and Woodhouse, on the 18th day of June, 1867, and consists in a new form and construction of the guide used in connection with the landside, and in a new method of attaching the moldboard to the standard, by which the parts are rendered more completely adjustable and the cost of construction is greatly reduced.

HAY AND COTTON PRESS.—Grey Utley, Charlotte, N. C.—In this invention the form of the press box and platen is the same as that now in common use, but by a new arrangement of guide rods for the platen in connection with a novel clamp and hand levers, the press may be operated by hand more rapidly and with greater advantages in regard to the application of the power and its full utilization than any of the hand or power presses now in use.

CORN PLANTER.—John Ellbertson, Kirksville, Mo.—In this invention the corn is planted by an instrument which can be carried in one hand and used in the manner of a cane. The device is intended to facilitate the work of planting or dropping the seed, and to obviate the necessity of stooping for that purpose.

APPARATUS FOR MAKING CARBONATE OF LEAD.—Otto Jacobi, Philadelphia, Pa.—This invention relates to an apparatus for converting, by the action of acetic and carbonic acids, lead into carbonate of lead. The invention consists in combining with a converter in which the lead is contained, a vinegar making apparatus and a furnace, all acting in conjunction with each other, the heat of the furnace causing the vapors to arise from a vessel containing vinegar mash, and to travel to the vinegar apparatus, whence the acetic acid arises into the chamber or chambers that contain the lead, converting the lead or its outer faces into acetate of lead. Carbonic acid is then conducted into the converter to transform the acetate into carbonate of lead.

FLOUR SIFTER.—Johann Nowak, New York city.—This invention relates to a flour sifter to be especially used by bakers, its object being to facilitate the process of sifting the flour and to economize labor.

LINIMENT.—William P. Hamlin, Exira, Iowa.—The object of this invention and discovery is to provide an effective and sure remedy for wounds and bruises, and for most of the pains with which mankind are afflicted.

PROCESS IN MANUFACTURING BILLIARD BALLS.—William H. Lippincott Pittsburgh, Pa.—This invention relates to the manufacture of balls used in playing billiards, baggatelle, and other games where globular balls are employed, and the invention consists in forming such balls of vulcanized india-rubber.

AMMONIAIZING SUPERPHOSPHATE OF LIME.—John S. Ramsburgh, New Market, Md.—This invention consists in ammoniaizing superphosphate of lime in such a manner that its fertilizing qualities will be preserved when the same is exposed to the atmosphere.

FINGER FOR SHUTTLE STOP MOTION FOR LOOMS.—E. S. Laney, Waterloo, N. Y.—The nature of this invention relates to improvements in fingers for shuttle stop motions for looms, whereby the same are made less liable to get out of proper position on the oscillating rod which actuates the touch off fingers, by reason of the sudden shocks and strains to which they are exposed rom the action of the shuttle.

MACHINE FOR MAKING PAPER PULP.—Warner Miller, Herkimer, N. Y.—This invention relates to an improved mode of operating the followers, whereby the wood to be ground is pressed against the periphery of the stone, a positive mechanical device being used in the original patented machine, but in this springs or weights are employed, so arranged and applied that the machine is greatly simplified, and made to operate in a more perfect manner. It also relates to an improvement in the screening apparatus, whereby the pulp is not only deprived of all coarse, foreign substances, but also separated or divided into two or more different qualities with respect to the length and diameter of its fiber, whereas the original machine separated the pulp with respect only to the diameter of its fiber, and the different parts thus separated discharged from the machine at separate points, so that they cannot mingle with each other.

LAMP BURNER.—Wm J. Ross, Worcester, Mass.—This invention relates to a lamp burner, and it consists in the application of vents or tubes to the burner or socket thereof, for the purpose of admitting external air into the lamp and preventing explosions, now due to the accumulation of vapor or gases in the lamp, above the oil. It also consists in a novel and improved means for raising and lowering the wick, and in an improved fastening for securing the chimney to the burner; and finally, in an air guide constructed in such a manner as to prevent or conduct the air to the flame, and cause the latter to burn in the most favorable manner, both as regards form or shape and illuminating power.

LOADING HAY AND GRAIN.—S. R. Higgins, Parma, Mich.—This invention relates to a machine to be attached to a wagon or cart for the purpose of loading the same with hay or grain as it is drawn over the field.

WHEAT DRILL.—James W. Davidson, Mount Auburn, Ill.—This invention has for its object to furnish an improved machine for sowing wheat or other grain in drills, which shall be convenient and accurate in operation, and which shall cover the grain at a sufficient depth beneath the surface of the ground to protect it from the winter.

CHART OR MAP ROLLER.—E. L. Hagar, Empire City, Col. Ter.—This invention relates to a roller for maps or other similar charts, and it consits in arranging the roller therefor within a case, that is suitably constructed to allow the map or chart attached thereto to be rolled up or unrolled at pleasure through and by means of cords and tassles, or other suitable devices, the case encasing the charts when rolled, and protecting them from becoming soiled or injured.

STUMP MACHINE.—Isaac J. Bogert, Fayette, Iowa.—This invention has for its object to furnish an improved machine for pulling stumps, raising and moving heavy weights, etc., which shall be simple in construction, easily operated, and powerful in operation.

PALLET FOR WATCHES, ETC.—Charles E. Mason, Elgin, Ill.—This invention relates to a novel manner of inserting the jewels or pallets in the block or stud provided for them.

COMBINED BEDSTEAD, CHAIR, SECRETARY AND WARDROBE.—Wm. Reckards, New York city.—This invention relates to a combination of a bedstead, chair, secretary and wardrobe, and it consists in a novel constructio and arrangement of parts, whereby the device may, by a very simple manipulation, be converted into any of the articles above mentioned, and when not in use be capable of being adjusted or folded up to represent a book case, or other similar piece of furniture.

ANNUNCIATOR FOR HOTELS, ETC.—N. A. Patterson and H. T. Carr, Winchester, Tenn.—This invention relates more particularly to an annunciator for hotel purposes, though the same mechanism and principle may be applied to other buildings, as large publishing houses, manufactures and stores. It consists of two corresponding dials, on which are written, engraved, raised, printed, or painted, the wants or orders common in whatever building or business the annunciator is designed to be used.

LAMP BURNER.—Gilbert Lavere, Bridgeport, Conn.—This invention consists in the combination of two chambers forming an essential part of a burner tor petroleum lamps, together with other devices perfecting the whole.

POLE TIP.—Alonzo Benedict, Albany, N. Y.—The object of this invention is to provide a metallic tip for the tongues or poles of carriages, which will not strain the leather of the neck yoke to so great a degree, nor distort the same to so great an extent as the pole tips heretofore used, and which will enable a lighter and neater neck yoke leather to be used.

APPARATUS FOR OPERATING HORSE HAY FORKS.—George M. Robinson, New Wilmington, Pa.—This invention has for its object to furnish an improved device for supporting and holding the fork while carrying a fork-load of hay to the mow and while returning empty for another load.

EXTENSION TABLE.—De Lance Cole, Marshall, Ill.—This invention has for its object to furnish a simple, inexpensive, convenient, and substantial means for enlarging or extending an ordinary breakfast or dinner table to any desired size or extent.

SPRING SEAT FOR SADDLES.—Robert J. Steele, Jr., Rockingham, N. C.—This invention has for its object to furnish an improved spring seat for saddles, which shall be so constructed and arranged as to be easy and comfortable to the rider, however rough may be the horse's gait.

PERPETUAL CALENDAR.—Charles T. Pooler, Deansville, N. Y.—This invention relates to a calendar which is so arranged that it can be used continually to record the days of the week or month, and that the days of the week can be set over the figures of each month in such a manner that the device is applicable for each year.

TOBACCO PIPE.—Henry G. Dayton, Maysville, Ky.—This invention relates to a tobacco pipe which consists of an outer bowl, without a bottom, and of an inner bowl that is fitted into the outer bowl, and that is, by the tube projecting through a perforation into the inner bowl, held in place.

ADJUSTABLE COUCH.—Godfrey Widmer, New York city.—This invention relates to a couch which is provided with an adjustable head rest, so that it can be adapted to any desired position of the body. The invention consists of a longitudinally and transversely adjustable frame, upon which a sheet of canvas or other fabric is stretched, and of a frame swinging within a fixed frame and projecting above the same, so as to elevate the canvas and to form the head rest of the couch.

WATCH.—Charles Springer, Newcastle, Pa.—This invention consists in applying about and around the standing collar surrounding the winding arbor, a center square which moves the hands, or both, of a watch movement, for instance, of that class known as the "American," an adjustable grooved collar, having a suitable packing medium, to form a tight and close joint when the watch is shut, with the case thereof, and thus exclude the entrance of dirt to the interior mechanism of the movement.

BAIL EARS FOR PAILS.—Jonathan Walton, Brooklyn, N. Y.—This invention relates to an improvement in bail ears for wooden and sheet metal or tin pails, and it consists in constructing the ears of wire bent in proper form and attaching them to the pail either by clinching or by soldering.

CORN PLANTER.—A. J. Going, M.D., Clinton, La.—This invention relates to a machine for planting corn and other seed, such as peas, rice, etc., and is an improvement on that class of seeding machines in which a rotating wheel provided with seed cells in its periphery is used for a discharging device. The invention consists in a peculiar application of a small metallic plate, whereby the seed cells of the wheel, as they rotate and pass from underneath the hopper, are cut off from the grain or seed contained in the latter, so as not to have the seed cut, bruised, or injured in the least.

AERIAL NAVIGATOR.—Zaphna Stone, Kinsman's, Ohio.—This invention relates to a device for navigating the air, and it consists in constructing a balloon in a novel way, whereby it may be made to rise and descend at the will of the operator or navigator, and be under the complete control of the latter.

CORN PLANTER.—Wm. H. Fish, Scarsdale, N. Y.—This invention relates to a device for planting corn and other seed in hills, and it consists in a novel construction and arrangement of certain parts, whereby the seed may be dropped regularly at proper intervals.

WATER INDICATOR AND ALARM ATTACHMENT TO STEAM BOILERS.—Thomas Flinn, Brooklyn, N. Y.—This invention relates to a device for indicating the hight of water in steam boilers, and for sounding an alarm if the quantity of water should rise or fall in the boiler beyond the required limits. The invention consists in the use and combination of a cylindrical vessel, which is screwed or otherwise secured upon the boiler, with a rod which is supported by a float above water, and which fits into the cylindrical attachment, having a pin by means of which the hight of the water will be indicated on a graduated scale arranged on the cylindrical vessel.

SUSPENSION BRIDGE.—Edward M. Carpenter, Middletown, N. Y.—This invention relates to a suspension bridge which is so arranged that it can always be held tense, and that it does not depend upon the construction and strength of the top and bottom cord. The invention consists in making each of the uprights of the bridge of two pieces, which are not at all connected with each other, and between which from above a wedge is inserted, which drives the upper ends of each pair of uprights apart, thereby stretching all parts of the whole bridge frame, and producing the desired arch.

SPOOL HOLDER.—A very neat contrivance for holding spool cotton is the invention of G. A. Pridham, Newark, N. J., patented Jan. 28, 1868. Spools of various numbers of thread are placed in a row inside a plated holder, the size being engraved on the outside of the case, so that any required number may be tried by the seamstress without taking the spool from the case till the thread is used up.

DOOR BOLT.—G. A. Pridham, Newark, N. J., patentee.—The advantages of this invention are that it is impossible for the bolt to be moved except by the knob on the inside of the door. This knob combines a screw fastening, which is forced against the bolt after it is operated, and holds it firmly in place, so that it cannot be forced back from the outside. J. H. Jillson, general agent, corner of Walnut and Mulberry streets, Newark, N. J.

THAWING OUT FROZEN WATER PIPES.—William Young, Easton, Pa.—The object of this invention is to provide means for readily thawing out the ice in water pipes when they become unserviceable from freezing, and also to be used for other purposes of a similar nature, and the invention consists in the use of steam for that purpose in the manner described.

FURNACE FOR THE MANUFACTURE OF CAST STEEL.—Francis Ellershausen, Montreal, Canada.—This invention relates to a furnace for the manufacture of cast steel from pig iron, in conjunction with wrought iron or iron ore, and for the purpose of smelting blistered steel in large quantities, and for re-smelting metals in general. The invention consists in the novel combination of two fire chambers, which are separated by a bridge; a large crucible being set up in one chamber, the fire in which chamber surrounds the crucible, while the other is a reverberatory fire chamber, by means of which the heat around the crucible is brought to an extreme degree.

VENTILATING COOK STOVE.—Luthur M. Parsons, Waukau, Wis.—This invention relates to a method of ventilating a room and of supplying the necessary air to the burning fuel, and it consists in arrangement of flues, dampers, and pipes, whereby the impure air in the upper portion of a room is made to supply the fire, thereby preventing the current of fresh and healthy air which flows toward the stove on and near the floor to supply the draft from being drawn off, but retaining it for purposes of respiration.

HEMP BREAKING MACHINE.—J. S. Hoskins, Spring Hill, Mo.—This invention relates to a hemp breaking machine, and consists of a main frame on which are set two rollers on the peripheries whereof are a number of sharp pins similar to the hackle teeth of hackling cylinders.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

R. A. D., of Fla., asks the amount of feed per certain number of revolutions of a circular saw working in hard Florida pine. "Doctors disagree" in this matter. A good manual on sawing is Parson's "Sawyers Companion."

F. W. W., of Md., asks if "a small boat twenty feet in length, if built for the purpose, can be propelled with less exertion by a propeller wheel than by two oars, and what should be the pitch and number of blades." Experiment alone can determine the relative value of oars and screw under such circumstances. There are, however, several objections to the latter on a small boat, apart from the question of relative speed or ease of propulsion.

E. H. B, of Mich.—The Watt formula for horse-power of a steam engine can be found in Muirhead's "Life of Watt," and that and the difference between nominal and indicated horse-power has been repeatedly shown in our columns.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Two sets superior iron-frame cards, 48-in. breakers, 40-in. finishers, one 30-in. double-cylinder roll card, one 24-in. do., one 200-spindle jack. For sale cheap. Apply at Union Iron Works, Rhinebeck, N. Y.

Wanted—the address of every canvasser in the United States. Send two stamps to P. & K., Box 2359, Cincinnati, Ohio.

I desire to buy a popular patent for the State of New York. Address A. Roberts, Box 2931, Buffalo, N. Y.

For Improved Lathe Dogs and Machinists' Clamps, address, for Circular, C. W. Le Count, South Norwalk, Conn.

Brick Machine.—Lafler's New Iron Clad has more advantages than any other ever invented. For descriptive circular address J. A. Lafler & Co., Albion, Orleans county, N. Y.

Broughton's graduating lubricators for steam engines cannot leak, and are the only reliable ones.

Manufacturers of W. H. Culf's patent pump send card and price list to R. C. Vanderford, Centralia, Nemeher county, Kansas.

Funston's electric toy.—See advertisement.

Mill-stone dressing diamond machine, simple, effective, and durable. Also, Glaziers' diamonds, and for all mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For Sale—Eight new portable steam engines, thirty horse-power each, of superior construction. Address Poole & Hunt, Baltimore.

First class lock makers wanted. Address Jones & Nimick Manufacturing Co., Pittsburgh, Pa.

Make your patents pay!—J. H. White, Newark, N. J., will make and introduce to the trade, all descriptions of metal goods.

Olmsted's oilers—the most durable and convenient made. Sold by all dealers from Canada to California.

H. F. Speer, Rockport, Ind., wishes to purchase a small locomotive similar to the one described in this paper April 4th.

Broughton's standard oilers are the only really first-class oilers.

Volumes, numbers, and entire sets of Scientific American for sale. Address Theo. Hagar, Box 773, New York city Postoffice.

Agents wanted for Allison & Co.'s iron cement. It will stick anything together, and is not affected by water. A sample bottle will be sent, postpaid, to any address, on receipt of 25 cents. Allison & Co., Box 118 Sing Sing, N. Y.

Joseph Anzer, Box 762, Ashtabula, Ohio, wants an endless screw 3½ inches long, and worm, 16 to 18 inches diameter, center bore 1¼ inches.

Winans' Incrustation Powder, (11 Wall st., N. Y.) A positive remedy for scaly boilers, warranted effective and uninjurious. 29,000 refs.

NEW PUBLICATIONS.

MAP OF THE UPPER PART OF NEW YORK CITY, including a Topographical View of the Central Park. Hamilton E. Towle, C. E., City Surveyor.

This is an elegant pocket map of that portion of New York extending from a point two blocks below the southern end of Central Park to Spuyten Duyvil Creek, the upper or northern boundary of the city, with a representation of the proposed "west side" improvements, and correct plans of the Central Park and other reserved territory, with a route of the avenues and the proposed new Boulevard, all made from actual surveys and drawn to scale. It is the clearest, most definite, and comprehensive map of that portion of the city, except the one attached to the Central Park Commissioners' Report, we have yet seen, and will give the citizen as well as the stranger a correct idea of different points, and serve as a valuable guide to persons desiring to purchase desirable lots in this Babylon of the Western Hemisphere. The map is produced in colors by the American Photo-Lithographic Company, and may be obtained of the publisher, 78 Cedar street, New York city.

CENTRAL PARK REPORT.

We are indebted to Andrew H. Green, Esq., Comptroller, for a copy of the report of the Board of Commissioners for the year, 1867. It comes to us copiously illustrated with cuts and maps, showing the progress made in various works in charge of the Board. The expenditures for the year in construction amount to $199,264.06. A statement of the works completed during the year comprises many details of interest to the visitor to the Park, but which we have no space to describe. Many structures of rustic work, harmonizing well with the natural surroundings have been completed. The children's shelter is the most extensive example existing of this class of wood work. Experiments have been made for several years with cement, asphalt, concrete, and pavements of various sorts, none of which have proved entirely satisfactory, though some have developed valuable qualities. Several pieces of work were laid in the Park during last fall with a composition of tar gravel, and cement. The materials have been put down in several different methods on the Park in various localities, and with a variety of substructures, for the purpose of testing their merits. On the whole the Central Park annual reports are the most comprehensive and neatly got up of any of the hundreds of reports, from corporations and associations, which are being constantly received at this office. The execution is exceedingly creditable to the compiler.

THE GALAXY. May. Sheldon & Co., 498 Broadway.

The new publishers have improved and enlarged this magazine, and it is now one of the handsomest and best of our numerous monthlies. Price $5 a year.

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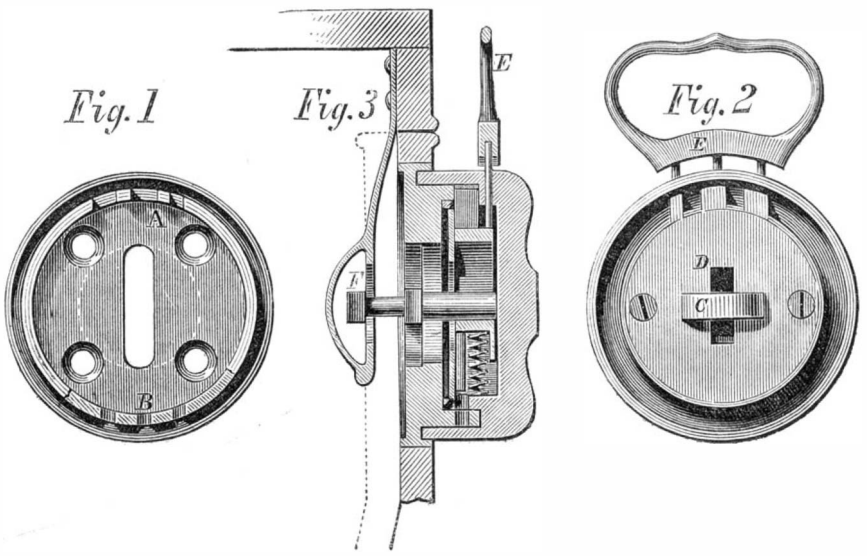
Improvement in Trunk and Door Locks.

A cheap lock, without complication of parts and not liable to get out of order, or easy to open by skeleton keys or temporary appliances, is a very desirable improvement. Such seems to be the one shown in detail and in several aspects in the accompanying engraving. Ordinary trunk and satchel locks are generally of such a plan and construction that they can be easily opened, even without their proper key, and are very liable to break, particularly when under the control of "baggage smashers"; and even door locks, on which night keys are used, do not always prevent surreptitious entrance.

The working parts of this lock are contained in a circular case, but they may be attached to a lock or case of any other form. The base or back of the lock—that portion permanently attached to the trunk or lid—is shown in Fig. 1, which gives the inside view. It is secured to a trunk, valise, or traveling bag by screws, passing through the holes shown, by rivets, or by any other sufficient means. Near its circumference is a raised circular flange, having on one side three or more parallel slots, A, and exactly opposite an equal number of drilled holes, B. Over this fits a cup-shaped disk, Figs. 2 and 3, having in its center a solid bolt, C, with a T-head, the end opposite the head being firmly seated in the body of the disk. When the part, A, and the disk, Fig. 2, are brought together, the head of C passes through an oblong slot in the central plate, D, and through a similar aperture in the base plate, A, when a quarter turn of the movable part, Fig. 2, brings the head of the bolt, C, across the slot, firmly uniting the parts, as in Fig. 2.



RUPPEL'S PATENT LOCK.

Between the center plate, D, and bottom of the cup disk, is a recess containing two, three, or more bolts lying in parallel recesses. These bolts are actuated at one end by springs, which force them out against the inner part of the flange, and at the other end by the action of a key, E, having as many pins as there are bolts. The pins of this key, being inserted into holes in the rim of the cup disk and pressed against the bolts, force them inwards until their ends correspond with the circumference of the ring holding the plate, D, when the lock may be opened and the parts separated.

Fig. 3 is a vertical central section of the lock, attached to a trunk. In this case the central bolt is extended through the base plate, and has a secondary T-head, F, passing through a slot in a plate attached to the trunk lid.

Fig. 4 shows the attachment of the lock to the knob of a door lock—the whole lock being contained in the knob. When the door is to be opened, as by a night key, the key, E, is inserted, which allows the knob to be turned and at the same time furnishes a lever to assist in turning it. By turning the knob half way around when the key is in, so that the apertures of the knob are on the top, the door can be opened as by any ordinary knob, and at all times the bolt, G, may be moved from the inside. The key, E, is absolutely necessary for opening the lock to which it belongs, as its pins are adapted exactly, in their length, to the bolts of each individual lock; and if an attempt is made to open the lock by the insertion of separate pins or wires, one single bolt may be pushed in too far, which will effectually prevent the turning of the cup disk by the protrusion of the back end of the bolt through the holes, B, in Fig. 1.

Patented through the Scientific American Patent Agency, January 28, 1868, by George Ruppel, Harlem, N. Y., who is desirous to dispose of the patent, or the right to manufacture.

Fire-Proof Bronze Color for Copper and Brass.

One-sixteenth of an ounce of crystallized verdigris, and the same quantity of finely pounded muriate of ammonia, are to be dissolved in five-sixths of a pint of rain water, the solution left standing covered for three to four hours, and then 1½ pints more water poured into it. The copper vessel, which must be perfectly clean, is now to be held over a charcoal fire until it is equally heated throughout and becomes uniformly tarnished. The copper is now to be rubbed over with the mixture and then carefully dried.

After five or six repetitions of this treatment, the copper receives a brass color; after from six to ten repetitions, it acquires a fine yellow. If the copper is now to be changed from yellow to brown, it must no more be wetted while hot; if, however, it be desired to have it very pale brown, the process must be repeated twenty or twenty-five times. When the desired color is attained, the copper is to be laid in clean water, taking care to clean it or dry it rapidly after taking it out. This must be done carefully. The copper is then held over a weak charcoal fire, when the bronze becomes permanent and fire-proof. To give a fire-proof, brown, bronze color to brass, the following is the process:

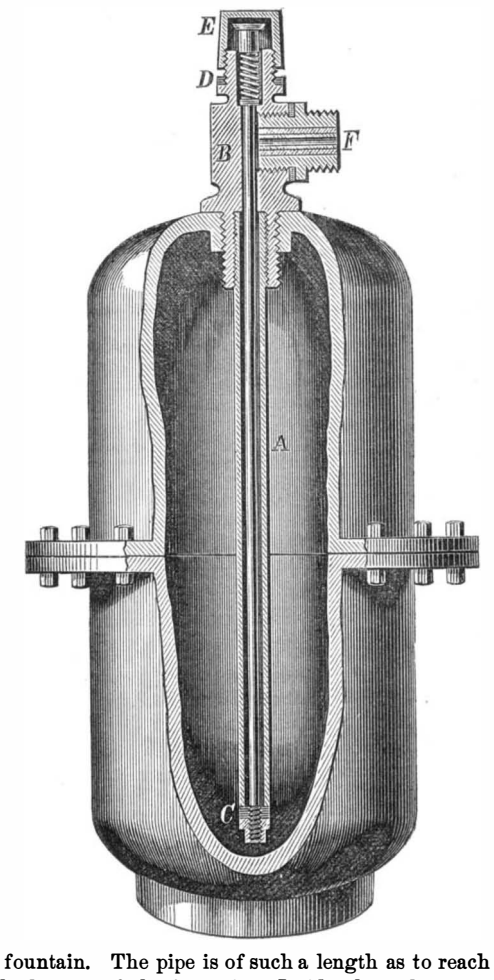
$\frac{3}{32}$ of an ounce of crystallized verdigris and the same quantity of sal-ammoniac are mixed with five-sixths of a pint of rain water, and left to stand from two to three hours. The brass is then to be rubbed over with it from two to three minutes, when it becomes green. 1¼ pint of rain water is now to be added to the solution. The metal is now held over a charcoal fire, which must not be too strong, until it acquires a copper color. It is then again wetted, and left to dry by evaporation. When it has been treated in this manner four or five times, it becomes olive colored. The heat may now be somewhat increased, but it is necessary to be very careful that the metal does not become too hot. When it has been treated nine or ten times in this manner, it becomes brown. As long as any greenish places are to be seen, however, this treatment must be continued, in many cases twenty to twenty-five times before the required color is obtained.

If, however, the metal be strong, the materials are to be dissolved in hot rain water, and the metal rubbed with it immediately until it acquires a fine dark green color; it is then to be held over a strong charcoal fire, by which means it acquires a fine brown color after ten to twelve repetitions of the treatment. It is necessary to be careful that the metal is equally heated throughout. If spots appear, they must be bitten out during the work and polished with brick dust.—*Gewerbeblatt aus Wurtem.*

SCHNACKENBERG & ROSENKRANZ' IMPROVED FEED FOR SODA FOUNTAINS.

The object of this device, for which a patent is now pending through the Scientific American Patent Agency, is to furnish a ready means for preventing the flow of the carbonic acid solution into the delivery pipe from the fountain, to make the transportation of the filled fountains easier and more convenient, and to allow the attachment and detachment of the delivery pipe without annoyance, danger, or trouble.

The pipe, A, of india rubber or any suitable material is attached to the metallic head, B, which screws into one end of



the fountain. The pipe is of such a length as to reach nearly to the bottom of the fountain. Inside the tube is a metallic rod furnished with a nut and elastic washer, C, at its lower end, and at the upper end with a knob and spiral spring. Over this knob is screwed a thimble, E, which, being screwed down, depresses the rod and opens a space between its nut and washer at the bottom of the tube, to allow the passage of the gas charged liquid to the delivery plug, F.

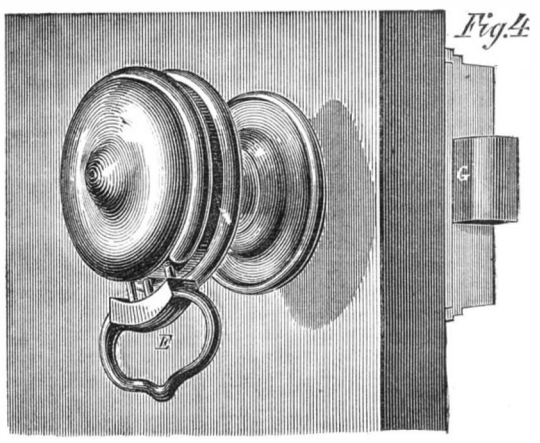
In transporting the charged fountain it is necessary only to partially unscrew the cap, E, allowing the spiral spring, D, to act in conjunction with the outward pressure of the gas against the bottom of the rod, to prevent the escape of the liquid; and at any other time the outflow of the contents of the fountain can be prevented or regulated by the same means.

Address Schnackenberg & Rosenkranz, care of the American Mineral Water Co., President street, between Nevins street and Third Avenue, Brooklyn, N. Y.

Notes on Recent Scientific Discoveries and their Practical Application.

BOTTLING LAUGHING GAS.

The use of protoxide of nitrogen, or laughing gas, as an anæsthetic agent, is no novelty, and would require no notice here, but for a suggestion recently made in the *British Medical Journal*, which offers a problem to mechanics. It would be very inconvenient for surgeons to be driving about with large bags of gas for administration to their patients. There are inconveniences also in the preparation of the gas on a small scale which disappear when the manufacture is carried on in a moderately large way. Now laughing gas can, by great pressure or intense cold, be condensed into a liquid, and



the suggestion of the journal we mention is, that liquid protoxide of nitrogen shall be sold, from which at any moment, by merely turning a tap, a bag of gas can be obtained for inhalation. To carry out this idea, bottles are required which will stand a pressure of at least 800 lb. The pressure at which the gas liquefies is about 30 atmospheres at the freezing point, so perhaps for a bottle to be perfectly safe at our ordinary temperature, it should be proved to 1,000 lb. There can be no difficulty, we should think, in producing such a bottle of cast steel, so light that a surgeon might take it with him on his rounds, and if there are all the advantages claimed for protoxide of nitrogen as an anæsthetic, there will probably be a considerable demand for such bottles. As regards the manufacture of the gas, and its liquefaction, these are very simple matters; the desideratum of to-day is a safe and portable bottle to hold the liquid, and we have little doubt that this will soon be furnished.

METALLIC CEMENT.

A very strong and durable metallic cement, we read in a German *Mechanics' Journal*, is formed when a mixture of equal parts of oxide of zinc, sulphate of lead, peroxide of manganese, and oxide of iron is made into a paste of proper consistence with boiled lineeed oil.

BRASS PICKLING.

Dr. Hiller writes that the brownish red color often obtained when brass work is pickled in the usual mixture of acids, may be avoided by making use of a mixture of equal parts of commercial nitric and sulphuric acids. Articles dipped in this mixture, and then well rinsed in cold water have, he tells us, a very beautiful deep yellow color.

A NEW OIL CAN.

A new can for applying lubricating oil is described in *Cosmos*. It is a cylindrical vessel of a size that can be grasped by the hand, and is much the same in shape as that in common use. The top, however is flexible, and there is a spiral spring in the interior. When oil is required the workman presses with his thumb on the top and forces just the amount necessary. On removing the pressure the spring restores the can to its shape, and the oil in the long spout is forced back by the influx of air. Thus there is no waste of oil by dripping.

EXPLOSIONS OF RED FIRE.

The frequent recurrence of such accidents as that at Nottingham—not often, however, so fatal in their consequences—justifies us in giving a general caution to any readers who may be disposed to amuse themselves with making colored fires. The ingredients for red fire should be powdered separately, and they should be mixed in a sieve, and never in a mortar by means of a pestle. With this precaution the mixing of the color is perfectly safe; but the liability to spontaneous combustion some time after it has been mixed is as great as ever. The spontaneous combustion, however, is not attended with explosion.—*Mechanics' Magazine.*

New Suspension Bridge.

The Legislature of New York has authorized the erection of a suspension bridge over the Hudson river, at the Highlands. The total length of the bridge will be 2,499 feet; between the towers it is 1,665 feet, and the clear span is 1,600 feet. Its hight above high water is 155 feet; it will bear a pressure of 5,280 tuns, and the breaking strain is 25,171 tuns. It could bear up at once 60 locomotives and 34,560 people; but 53 locomotives and 18,000 people would fill it. It will have twenty cables, each about fourteen inches in diameter, and these cables will contain 70,302 miles of steel wire. The towers will be 280 feet high. The iron and steel in the bridge will weigh 17,005 tuns.

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NEW YORK, SATURDAY, MAY 30, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

*Improvement in Feeder for Wool Breakers 337
*Improvement in Steam Boiler Gage Cocks 337
Gas Measurement 337
Ice—Its Collection, Storage, and Distribution 338
A 6,000 Pounder Gun 339
To Coat Iron with Copper or Brass 339
The Giffard Injector 339
The Moon as an Inhabited Planet. 339
*Improved Combination Tool for Machinists and other Mechanics 340
Whitewashing 340
A Locomotive Struck by Lightning 340
Venom of Toads 340
Weldless Steel Wires 340
*Gladding's Clothes Line Holder.. 340
Deficiency of Mechanics in California 340
Scarcity of First Class Workmen . 340
Editorial Summary. 40
*The Watch—Its History and Manufacture 341
Manufacturing, Mining, and Railroad Items 342
Recent American and Foreign Patents 343
Answers to Correspondents 343
New Publications 343
*Improvement in Trunk and Door Locks 344
Fire-proof Bronze Color for Copper and Brass 344
*Schnackenberg & Rosenkranz' Improved Feed for Soda Fountains 344
Notes on Recent Scientific Discoveries, and their Practical Application 344
New Suspension Bridge 344
The Use and Care of Edge Tools.. 345
Start Right 345
Preservation and Restoration of Paintings 345
Suaviter in Modo 345
Gold in New Brunswick 346
New Patent Bill in Canada 346
Lecture on Food 346
Patent Claims 347, 348, 349, 350
Inventions Patented in England by Americans 350
Extension Notices 350

THE USE AND CARE OF EDGE TOOLS.

It is said that Yankees are the most inveterate whittlers in existence, and we once heard one of our Yankee friends remark that the most valued and indispensable of his personal possessions were a pocket knife, pocket comb, and watch, with true national or natural instinct placing the knife at the head of the inventory. We say "national" instinct, because no American thinks of going without his pocket knife, which is to him a *vade mecum*, applicable to a hundred purposes and continually in demand. Yet comparatively few who consider the pocket knife a necessary adjunct seem to understand its care. It is seldom one can borrow a sharp knife from an acquaintance. It is either *left* as it came from the manufacturer, or has its edge rounded so its cross section is a conical wedge, or it is abraded to tenuity by the action of the coarse stone of the street grinder's machine, one of the most ruinous contrivances for sharpening knives or razors. But beside the neglect of the edge of a knife blade, the heel, which acts on the back spring, and the rivet in which the blade turns are seldom oiled, and it requires an effort not only to open a blade but also to close it.

As the pocket knife comes from the manufactory or store its edge is unfit for use; it may cut butter or cheese, possibly soft wood, but it will not pare finger nails nor sharpen lead pencils. It needs the hone and strop to produce an effective edge. And in the proper use of the hone or oil stone many are quite ignorant. First, nothing but a good oil stone is fit for sharpening a knife blade. Ordinary "whet stones," mere sand stones to be used with water, or dry, are too coarse; they are but fixed grindstones and rapidly abrade the substance of the blade without giving it an edge. The Turkish oil stone is greatly affected by some, but it is quite hard, and fit only for giving the finishing touch to very delicate tools. The Wachita, or Ouachita stone we prefer for pocket knives and for ordinary tools. The philosophy of whetting or honing is a gradual and mutual abrasion of the particles of the stone with those of the steel. The oil, with its glutinous quality, holds these commingled particles so that by the movement of the blade they act on the steel and abrade it very gradually. If the stone is too hard it quickly glazes and the blade slips over a perfectly smooth surface, producing no action on the hardened steel; if too soft, the stone allows the edge of the blade to disintegrate its surface and heap up a ridge of quartz-like or flinty particles, which produce a round or "stunt" edge, that in time must be removed by the action of the grindstone. One accustomed to sharpening knife blades can easily tell when the operation of honing is going on properly, and only experience can fully teach the process. There should be a certain feeling of resistance in the operation. The motion for whetting or honing should be circular; not as in stropping a razor, merely back and forth. The educated fingers will readily feel when the blade bears properly on the surface of the stone, and will guard against the mere abrasion of the back and the cutting in of the edge. This art can be only acquired by practice.

Few can hone a razor. Some barbers have the happy faculty, but generally it is an art little understood. The stone should be a fine Turkish stone perfectly clean and the oil used should be purified porpoise or nice sperm oil; pure olive oil is good. The blade of a razor is concave. The wedge like edge extends in its bevel but a little way back. In honing a razor the fingers should feel the back as well as the edge of the blade bearing; the back protects the edge. The motion should be the same as in honing a knife blade, circular. Few can hone a razor properly on the first trial.

In stropping razors most people fail. They will use a too yielding medium which rises suddenly as the edge passes over it and undoes what has just been done. Many turn the razor or knife blade on its edge. Unless the blade is lifted clear from the strop, just before turning, the tendency is to strop off the edge already on. A blade should be drawn from heel to point, starting at the heel and drawing it diagonally to the point, and should be always turned on its back.

Oil stones, as seen in the shops, are frequently worn concave. It is unnecessary to say that stones in this form will not produce a true edge. If the workman has not acquired skill enough to wear the stone evenly, as much at the ends as in the middle, he should occasionally grind the oil stone and reduce its surface to a level.

In the machine shop and the carpenter's shop—wherever edge tools are used—the oil stone is invaluable. It should, however, be used with discretion. If the tool is soft a short bevel should be given to the edge; if hard, it will stand a very thin edge, but the practice of producing a temporary edge by honing or whetting will not give even the best present result, and will necessitate a frequent resort to the grindstone, the office of which is only preparatory to the production of a good cutting edge.

The use of rapidly abrading substances, as fine quartz, emery, etc., is ruinous to good tools; and the continual employment of the grindstone not less so; while a judicious use of a good oil stone will keep tools in order until they are almost worn out.

START RIGHT.

In the construction of newly invented machines there is difficulty found very often in the practical application of theory. Theory generally takes in the most important principles, but it is rare that it includes all of the minor details. Delays and disappointments are the results of these deficiencies. To avoid these evils entirely is perhaps too much to expect, nor would we be so bold as to assert that it is possible so to avoid them; but by a proper method of proceeding they may be greatly lessened, and the progress of the work proportionably facilitated.

We will here give what we think to be the best mode of working out a new mechanical idea, premising that the remarks we shall make upon the subject are intended for those of our readers who are novices in invention, and to whom they may be found the means of smoothing the path which has proved to so many a path beset with thorns.

After due consideration to the general principles which underlie a new invention, and where the subject will admit of it, a mathematical demonstration of their truth, or (if that should be through the want of educational qualifications, or from the nature of the case impracticable), an experimental demonstration of them; the machine should be drawn to scale. In this drawing all the parts should be represented in section and in elevation. If the inventor has not sufficient skill to do this accurately for himself, he should make a sketch of his invention and employ a good mechanical draftsman to do it for him. The drawing of a new device accurately to scale, will generally disclose most of the practical difficulties which will be met with in applying theory to practice. If any doubt exists in the mind as to difficulty in making any adjustment for want of space in any of the parts, full allowance should be made for it in the drawing, as it will be found much better to have a little room to spare than not to have enough.

The next step is the making of the patterns, and here the experience of a good pattern maker will be found necessary, if the castings are of complicated form, more especially if they necessitate the use of cores. Very few persons not accustomed to this kind of work would be likely to make patterns which would be of any service; they would probably be totally worthless.

After the castings are obtained the machine should be finished in a workmanlike manner. If it is intended to do work that requires nicety of movement, a rude construction will only prove a useless expenditure of time and money. The expression, "It will do well enough to test the principle," is often heard from young inventors, but the truth is, more frequently, that it will *not* do well enough, and the work has all to be done over again, because of the unsatisfactory nature of the test. In all machines built for the purpose of testing a theory, it will be found to be the most economical to have the work done from the outset in the most complete manner.

These remarks are applicable to those inventions which require a working model to prove their value, and as the most important and difficult inventions are of that class, it is in their construction that an attention to the method of proceeding which we have described will be found of the greatest benefit. We assure such as are making their first efforts in invention, that we have learned the lesson we here inculcate in the "dear school of experience," and that although it may cost more in the first instance to do the work well, in the end the great economy of the course will be fully apparent.

PRESERVATION AND RESTORATION OF PAINTINGS.

Many of the finest of the old paintings were executed on panels of wood. Wood is a perishable material, and as a consequence it became in years worm eaten, or rotten, threatening the destruction of the picture, which, of course, was but a coat of paint, more or less thick, on the wood. How to preserve the painting while removing its rotten base appeared to be a problem hardly susceptible of solution; but the ingenuity of man has triumphed over what would seem to be an almost insuperable obstacle. Modern paintings are on linen canvas, almost indestructible by the lapse of time and ordinary contingencies, except from intended violence or accident. The linen wrappings of mummies, some of them over 3,000 years old, are found of good texture and sound, and the use of linen will probably be a means of preserving our modern paintings in a more perfect state for the admiration and interest of our posterity.

Paintings may be copied by skillful artists by the square inch, but if the copy is done by another hand than that of the artist himself, it loses somewhat of its original force and character; and even the painter cannot always reproduce indefinitely his original painting so that the life and freshness of the first picture shall be found in the copies. This may appear to be hardly credible, but it is an acknowledged fact well known to artists, and it will hardly appear to be strange when we consider how difficult it is for the mechanic to duplicate a machine, making it in all respects precisely like another, even with the aid of exact gages and the almost perfect operation of tools specially designed for the purpose.

The preservation, then, of original paintings becomes a matter of great consequence. When painted on panels the operation of removing the back and substituting another, either of wood or canvas, is perfectly feasible and is largely practiced by experts. It consists of securing the painting, face downward, on a table and planing the wooden back down to as near the paint as is safe, then carefully scraping with suitable tools until the paint itself is reached. When the wood is completely removed there remains a coat of paint, which is the priming and the superstrata, together forming the painting proper. A sheet of canvas, or, if preferred, a a backing of wood, is prepared with some adhesive cement and carefully placed on the back of the painting, pressed to place, and allowed to dry perfectly before the picture is lifted from its position. This process is, of course, a work of time, requiring skill, patience, and good judgment. In this country we believe it is not practiced to any great extent, but in Europe it is quite a business, and is very successfully practiced in several of the art centers of the old world.

SUAVITER IN MODO.

"Would it not have been more prudent, as well as more becoming, to have left to our readers the task of forming their own judgments upon the evidence on both sides brought before them in the course of this discussion?"

The passage which we here quote is taken from the close of an article by David Forbes, F. R. S., it being one of a series discussing "Some Points in Chemical Geology," which have been published in late numbers of *The Chemical News*. It is a caustic though we must consider it, when we take into consideration the provocations under which it was written, a very patient reply to a paper contributed to the February No. of the *Geological Magazine*, by Dr. Sterry Hunt, and also a review of Dr. Hunt's system of Chemical Geology.

Without intending to here enter into the merits of the discussion, we have thought as we have followed it during its progress, with a pleasure which has been marred by its frequent discourtesies, that other instruction might be drawn from it than was intended by either of the disputants, and the pithy words with which we have chosen to begin this article, seemed to us an excellent text from which to indite a short homily to all public or private disputants.

One of the very first of modern English essayists is Matthew Arnold, and although he has been attacked, and his opinions have been made a mark for the shafts of keenest satire, it is absolutely refreshing to witness the good humor with which he defends himself, and the modest and courteous language in which he refers to, and characterizes the opinions of his opponents. With what weapon can the armor of such a man be pierced? The vituperation and the ill natured personalities in which too many are prone to indulge, fall upon his unruffled temper like rain upon the plumage of a water fowl. It does not even create temporary discomfort, much less wound. Mr. Arnold's method of conducting a discussion is all the more admirable because it presents such a striking contrast to that which we are so often pained to notice. If the sole object of discussion is not to arrive at truth, and by comparison of views to ascertain error, it had better be avoided altogether; and no discussion should be made public which does not contain elements of instruction. Those then who assume the character of public disputants may be fairly supposed to believe that the views which they set forth are such as will throw light upon obscure points, or otherwise instruct and improve those who peruse, or listen to their arguments. They are then public teachers, and should remember that it is no part of the duty of an instructor to mix with good mental food, the bitter and nauseating gall of personal spite and animadversion.

The annals of science are, alas! too often stained with such bickerings. The scalpel of ridicule, and the microscopical examination and exposition of personal character, are too apt to usurp the place of calm investigation, and dispassionate interchange of ideas. Who can remember without pain the bitter contentions of Newton and Halley, with Flamsteed; or other instances which might be mentioned of later date but no less intense in their bitterness, which have been and will remain a disgrace to the cause of science. All earnest seekers after truth are, and should regard themselves as the children of one family, and should remember that charity and humility are not more becoming than they are conducive to the progress of sound science and learning.

We have observed with pain the eagerness with which scientific periodicals seize upon trivial salient points, in the pages of their cotemporaries, to make invidious comparisons and to charge upon them ignorance and inefficiency. To such the quotation above cited is applicable. Is it truth we seek, or self-aggrandizement at the expense of others' mishaps? Are there not enough means at hand to display our wisdom, without laboring to prove that others are ignoramuses? If we answer these questions affirmatively, let us

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throw the cloak of charity over each others' failings; the charity which suffers long and is kind, which envieth not, which vaunteth not itself, which is not puffed up. Let us leave to political journals the bespattering of each other and the coarse personalities of angry disputation, and, patient with differences in opinion and modest in self assertion, remember the words of Colton:—"We are more inclined to hate one another for points on which we differ, than to love one another for points on which we agree. The reason perhaps is this; when we find others that agree with us, we seldom trouble ourselves to confirm that agreement; but when we chance on those that differ with us, we are zealous both to convince and to convert them. Our pride is hurt by the failure, and disappointed pride engenders hatred."

GOLD IN NEW BRUNSWICK.

A few days ago we received a visit from Mr. Thomas W. Langstaff, of Woodstock, Carleton county, New Brunswick, who exhibited some specimens of gold obtained in that county from washings of alluvial deposits with specimens also of gold-bearing quartz, apparently very rich, whether examined by the naked eye or by means of a microscope. None of it has yet been assayed to test its actual value. The specimens compare favorably with those we have seen from California.

Last fall Mr. Langstaff and others associated with him, having discovered what they considered unmistakable indications of gold, and having purchased from the provincial government over thirty square miles of territory, made a test of one portion of the purchased territory. All of it is on the eastern branches of the St. Johns river in three counties, those of Victoria, Northumberland, and Carleton. The test was made in the latter county, about twenty-seven miles from Woodstock, on the Shicktehauk, a branch of the St. Johns. A party, of whom an experienced California miner was one, proceeded to the locality selected for the experiment, where a sluiceway made of boards, being twelve inches in width by nine inches in depth and about two hundred feet long, was erected "Riffles" had been fitted into the sluice at its lower end and about three cubic yards of sand and gravel were shoveled into the upper end. At the lower end which was between twenty and thirty feet below the upper, there had been placed a small quantity of quicksilver for collecting the minute particles of gold which might otherwise have been carried off with the sand by the force of the current. With these rude appliances there was produced nearly ten dollars' worth of gold, which we have seen. This gives a yield of over three dollars per cubic yard of earth, dug on the margin of the stream, the workmen not even wetting their feet. Beside this, a nugget was picked up worth some four dollars. One of the party, an old Pike's Peak miner, "panned" out in fifteen minutes a handsome show of gold, and declared that the deposit fully equaled any he had seen in his experience. The next day a boy of fourteen washed out his day's diggings, carrying home the commingled sand and gold and finishing the panning at home, which yielded over three dollars in pure gold.

Yet it is believed by experts who have examined and tested this locality on the Shicktehauk and others comprised in the purchase that the former does not present so favorable indications as those on the Muniac and Serpentine.

All this country is well wooded, the soil is fertile, and the streams never failing, in many cases affording excellent water power. Further information in regard to these deposits may be obtained by those who feel an interest in this matter by addressing T. W. Langstaff, Woodstock, N. B. or J. H. Lord, Box 773, New York city.

NEW PATENT BILL IN CANADA.

No little sensation and indignation is manifested in New Brunswick by an effort of the new Canadian Parliament to enact a new patent law, less liberal in respect to non-residents if possible than the existing one. The following extracts from an editorial in the Montreal *Evening Telegraph* give some facts relative to the new bill, which, if passed, will be one of the most illiberal and incongruous laws ever enacted. We are assured by private letters, that the bill cannot pass without such amendment as will allow the citizens of New Brunswick the rights they now possess to grant patents to non-residents, and to obtain patents in the States on the same terms as citizens of other countries which the proposed law would abrogate.

The writer in the *Telegraph* says of the proposed bill: "It contains provisions which are certain to embitter the relations between the Maritime Provinces and ourselves, and will by no means tend to remove the difficulties of the position of those who desire to see the Legislative Act of Union one in reality as well as in name. The object of the present bill is, no doubt, to enable the public to benefit by the inventions of foreigners, among whom, from the very terms of its provisions, are included all British subjects not residing in the Provinces, as no inventor can take out a patent here who has not resided in Canada for at least twelve months, and no one can take out a patent at all unless he is the *bona fide* inventor.

"That the law, as proposed, will have a prejudicial effect on the relations between us and the Maritime Provinces, must be apparent to every one who knows the facts of the case. In the United States, patents are issued on the same terms to citizens and foreigners, provided that, in the case of the latter, the country to which they belong grants equal privileges to all applying. In that case the charge is $35 in greenbacks. But if there are prohibitory laws, as is the case with us, then the charge for issuing a patent is $500. By the law in New Brunswick, no difference is made between residents or non-residents; any one is entitled to take out a patent who can comply with the rules of the Patent Office as to his right to the invention. Inventors in New Brunswick have been heretofore, therefore, entitled to patents in the United States at the lowest rate. When this bill passes, they will be at once cut off from this privilege.

"But, besides this, the patents issued for the separate Provinces under the old law are to cover only the same extent of territory as that for which they were issued. By one section, it is provided that every patentee must, under a penalty of $100 or two months imprisonment, have on the article patented by him, the word "Patented" and the year in which it was granted; and by another section, any person having on an article not patented, any word representing that it has been so, subjects himself to a fine of $200 or three months imprisonment. It is plain that if these two sections are enforced a patentee is on the horns of a dilemma. If he keep the patented articles for sale, without the mark, in the Province in which the patent is granted, he subjects himself to a fine of $100 or incarceration for two months. If, on the other hand, he send out of his own to one of the other Provinces to which his patent does not extend, arti les marked as patented, he finds himself liable to a fine of $200, or three months in jail. That this is the absurd position the proposed law will bring us to, there can be no doubt, as any one may satisfy himself by examining the bill. There are other defects which are evident on a mere cursory examination. For instance, by Section 38, any one may file a caveat who has not yet perfected his invention, and is afraid of his idea being made use of by others. And this provision is only fair. But the caveat appears to have an effect in perpetuity, as no time is given in which it shall lapse; and it does not appear to be contemplated that any intimation shall be given to the applicant filing a caveat, when any one else applies for a patent to cover an invention of the same kind as that to guard which the caveat is filed. Without furthur discussing details, it is sufficient that the whole principle of the bill is false, and will work most mischievously. Canada stands alone in this prohibitive policy, which will not only prevent Canadians from reaping the advantage of their own inventive faculties, but will also throw the manufacture of the most important patents into the hands of others; as where expensive models and machinery are required, no man will be foolish enough to invest in them, at the risk of losing the whole fruits of his labor, even although he does obtain the invention by the simple method of robbery, since every one else may plunder him."

[P. S. We are happy to learn through Mr. Charles Legge, just as we go to press, that the proposed bill has been withdrawn, and that no new one will be presented during the sitting of this Parliament, so the old laws will remain in force another year. In the meantime, we hope with our correspondent, that a bill will be framed which will meet the ends desired. Patents will continue to be issued to American citizens in New Brunswick, as heretofore, on liberal terms. Persons desiring patents in that Province can obtain all information respecting the cost and other requirements by addressing this office.—EDS.

LECTURE ON FOOD.

The lectures on Food which have been delivered by Dr. Letheby, at the Society of Arts, are a valuable and permanent contribution to the literature of Europe on a very important subject. In noticing these lectures we shall confine our condensed extracts to those passages which every one can understand, taking it for granted that these competent to follow the scientific arguments will consult the original reports, either in the medical press, where the lectures were first published, or in the volume which Dr. Letheby will, no doubt, do the English-speaking world the favor of publishing.

Tables have been more than once issued, showing the proportions of different food required to yield a certain number of grains of nitrogen, or to show the nutritive value of certain foods; but these, although very proper subjects for the investigation of men of science, are of very little value in a popular sense—so much depends on various modifying agencies, on cookery, powers of digestion, climate and admixture of food. Dr. Letheby early observes that all foods are derived from the vegetable kingdom. In other words, "All flesh is grass," "for no animal has the power of associating mineral elements and forming them into food." It would be a curious question to raise to a party which had just consumed a prime sirloin—how much guano, superphosphate, and farmyard manure had gone, by the intermediation of grass, hay, turnips, and oilcake, to the construction of that beef. Whether the laboratory may eventually manage to manufacture meat is a question which we have not yet commenced to solve. "Man (at present) is a destructive, not a constructive animal." Dr. Letheby begins with the value of vegetable food. Wheat stands first in Europe. The attempts to restore the use of more bran in flour have not been successful, and it is not at all certain that they ought to be. At any rate, navvies believe that white bread is more easily digested than brown bread. Bran has frequently a very irritating effect on the intestinal organs. In practice, 100 lbs. of flour will make from 133 to 137 lbs. of bread; so that a sack of 286 lbs. should yield ninety-five 4 lb. loaves. The baker increases this quantity by hardening the gluten with alum, or with 3 lbs. or 4 lbs. of rice, which, boiled to a gummy mess, will make the sack of flour yield one hundred 4 lb. loaves. Scotch oatmeal is more nutritious than English; but oatmeal is not so economical a food as wheat flour. In 1695, before tea and coffee were common drinks, it appears, from an advertisement quoted in the lectures, that there was a large consumption of water gruel "at the Marine Coffee House, Birchin Lane, Cornhill." The value of barley and rye bread we need not stop to discuss. Philosophers recommend them to the poor, but the poor abandon their use as soon as they can get wheat bread. Maize, or Indian corn, on the other hand, has been established in Ireland as a staple of food ever since the potato famine. Yet, although rich in nourishing matter, it will not make good bread. When deprived of its gluten and harsh flavor by means of a weak solution of caustic soda, and then dried, it forms the expensive food called "corn flour." Peas, beans, and lentils are very nutritious where they can be digested. Nothing but the most prolonged cooking will serve to help in this particular. They are deficient in carbonaceous constituents, and therefore invariably eaten with fat. Thus beans and bacon, and butter with beans, are inseparable in this country, while in the backwoods of Canada, haricot beans boiled and then fried with salt pork are the standing dish of the wood cutters. Potatoes, according to their price, are the most economical food, but the nutritive value is not great. They are deficient in fat, and should be accompanied with dripping, or better still with milk, if meat or fish cannot be had. On potatoes and milk a family of children can be reared well. Potatoes are best cooked in their skins, for the waste is then only about three per cent, or half an ounce in a pound, whereas if they are peeled, it is three ounces in a pound. Mealy potatoes are the most digestible; late in the season, when they are waxy, they are best cooked by stewing. Potatoes are one of the best anti-scorbutics, and are therefore used fresh or preserved in all sea going vessels. There is little nutriment in the garden vegetables in common use. They are much less nutritious than the potato, and they are chiefly valuable for their antiscorbutic properties, for their quality of flavoring insipid food, and diluting strong ones. Cheese theoretically ranks high for nutritive power, being especially rich in nitrogenous matter, but it is extremely difficult to digest, and cannot therefore be taken in large quantities.

Almost all Europeans eat meat if they can get it. Although during the Irish famine it was found that the people preferred stirabout to meat soup, when Irishmen settled in England or America they became as great meat eaters as their neighbors. The amount of bone in beef is rarely less than 8 per cent; in the neck and brisket it is about 10 per cent, and in the shins and legs of beef it amounts to one third or even one half of the total weight. The most economical pieces are the round and thick flank, then, the brisket and sticking-piece. Horse-flesh, Dr. Letheby says, is considered on the Continent superior to beef; and no doubt a steak from a fat horse is better than one from a lean milch cow or patriarchal bullock. Good bacon should not lose more than ten to fifteen per cent in in cooking. Experience has taught what science has proved—viz., that the large amount of carbonaceous matter in bacon makes it the best addition to substances rich in nitrogen, such as eggs, veal, poultry, liver, beans, and peas. Dr. Letheby remarks that "fish is not a favorite article of diet with the laboring classes, unless it is salted or smoked, perhaps because it does not easily satisfy hunger and is quickly digested;" but it is more probable that the cause rests in the necessity of more elaborate cooking and appliances for certain kinds of fish. All fish are in their best condition at the time of the ripening of the milt and roe; they are fatter, and have a better flavor. Eggs contain about twenty-six per cent of solid matter, of which fourteen per cent is nitrogenous and ten and a half carbonaceous, or fatty: the yolk contains the fat, while the white is richest in nitrogen. Eggs being very deficient in carbonaceous matter, go well with fat bacon, oil in salid and farinaceous food. Fat in some shape is universally consumed. Cocoa and chocolate owe their chief value to the fat they contain; Cocoa is composed of fifty per cent of fat. Of liquid articles of diet, beer and porter stand first in nutritive value. It is estimated that for the daily supply of London city there are distributed about 4,200 tuns of fish, over 4,000 sheep, nearly 700 oxen, about 90 calves, 4,000 pigs, (including bacon ond hams), 5,000 fowls, a million oysters, and nearly a million quartern loaves.

In Dr. Letheby's second lecture he refers to the artificial means of encouraging digestion. The functions of saliva are to lubricate the food for deglutition, to carry oxygen into the stomach, and to furnish a solvent for starch and tender cellulose. It has no chemical action on fat, or fibrin, or albuminous bodies. An artificial saliva may be obtained. Liebig's extract of malt is an example of this; also Mr. Morson's saccharated wheat phosphates. Both of these are aids to the digestion of farinaceous food. Pepsin is artificially prepared by several persons to assist digestion, by a preparation, as it were of gastric juice. The strongest pepsin is obtained from young healthy pigs, which are kept hungry, and are then excited by savory food, which they are not allowed to eat; while the influence of it is strong upon them, and the secretions are pouring out in expectation of the meal, the animals are instantaneously killed by being pitted. Pepsin, like diastase, is rendered inert by a temperature of from 120° to 130° Fah., and therefore hot drinks after a meal are hurtful. Cooking has an enormous influence on the digestibility of food. We cannot believe that roast mutton is less easily digested than ox liver or than goose or beef. It seems that of starchy substances, roast potatoes are more easily digested than boiled. Dr. Letheby sums the aids to digestion thus: First, proper selection of food, according to the taste and digestive powers of the individual; secondly, proper treatment as regards cooking, flavoring, and serving it; thirdly proper variations of it, both as to its nature and treatment, so that the appetite may not fail; fourthly, exercise, warmth, and a genial disposition. The last condition shows that those who give elaborate dinners should take care to provide one or more amusing guests. We have said enough to draw attention to these lectures, which condense in a popular manner, the latest scientific investigations in connection with the subject of food.—*London Journal of Gas Lighting.*

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OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING MAY 12, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

77,707.—STOVE GRATE.—D. S. Baker, West Bloomfield, N. Y.

I claim, 1st, A rotating grate, h, having upright figures, m, in combination with the lower grate, i, constructed and operated in the manner substantially as shown and described, and for the purpose set forth.

2d, The combination of the fingered ring, C, with the fire box, A, fingered rotating grate, h, and the under supporting grate, i, constructed and operated in the manner substantially as shown and described and for the purpose set forth.

3d, The combination of a cylinder or fire box, or its equivalent, with a fingered ring or bar, C, as shown and described, and for the purpose set forth.

4th, The combination of rotating grate, o, with a fingered ring, n, constructed and operated in the manner as shown, and described and for the purpose set forth.

5th, In combination with said parts, as just described, the fingered ring, C, or its equivalent.

77,708.—CORN HARVESTER.—Moses Bales and Wm. P. Bales, London, Ohio.

We claim, 1st, The arrangement of gatherers, E E', spreaders, F F', curved bar, I, and central platform, O O', for the purpose set forth.

2d, The oblique sickles, JJ', lips, jj', obliquetongue, N, and pivoted frames K K', combined and operating in the manner explained.

3d, The pivoted platform, O O', in the described combination, with the discharging lever, P, arranged and operating as set forth.

4th, The curved guide or rod, R, in the described combination, with the gatherers, E E', spreaders, F F', curved bar, I, and platform, O O', for the purpose specified.

77,709.—AUTOMATIC FAN.—Joseph Beck, New York city. Antedated April 25, 1868.

I claim, 1st, The employment of the fan, C, constructed with the protectors, b b and c c, operated and for the purpose substantially as herein described.

2d, The arrangement and combination of the clock work, G, the balance, V, with the crank, W, the rod, X, the arm, Y, the axle, 7, the gear, Z Z, and the fan shaft, C, operated and for the purpose as herein shown.

77,710.—MACHINE FOR THREADING BOLTS.—Benjamin D. Beecher, Plantsville, Conn., assignor to Luther Beecher.

I claim, 1st, Arranging the cutting threads on the surface of the dies, as herein described, that is to say, so that a portion of each of said die surfaces shall be left plain, for the purpose of gradually rounding the blank, as the operation of threading it progresses, and the initial or commencing portions of the several cutting threads shall follow one another in succession, all substantially as set forth.

2d, In combination with the threaded part of the die, the embossed surface, k k', substantially as and for the purpose set forth.

77,711.—FENDER RING FOR HEATING STOVES.—N. A. Boynton, New York, assignor to himself and Daniel E. Paris, Troy, N. Y.

I claim a fender ring situated at or near the bottom of a fire pot, with its outer edges turning upward, so that the ring and the pot shall form together an acute angle, with its point toward the base of the pot, substantially as and for the purposes described.

77,712.—DRYER.—Joseph Brakeley, Bordentown, N. J.

I claim combining with a dry-kiln both a condenser and an exhaust pump, substantially as and for the purpose set forth.

77,713.—MACHINE FOR MAKING WIRE HEDDLES FOR LOOM HARNESSES.—Darius C. Brown, Lowell, and John Ashworth, North Andover, assignors to D. C. Brown, Lowell, Mass.

We claim the combination of machinery for spreading the heddle eye lengthwise, as described, and also the combination of machinery for spreading the heddle eye lengthwise as specified, with mechanism for forming such eye from wire, in manner substantially as explained, such mechanism for spreading the eye consisting of the fingers, q3 q3, and mechanism for operating them, as set forth.

Also, the presser, R, as constructed, and provided with mechanism for operating it, substantially as described.

Also, the combination of such presser, R, (provided with mechanism for operating it, as described) with the eye former, P, made substantially as described, so as to form and spread the eye of the heddle, as specified, and with the next adjacent twisters, T U, to form the twists of the eye, as explained.

Also, the mechanism or combination for straightening the wire during its passage into the machine, the same consisting of the curved arm, I, and its pins, m n, and the slider, K, and its pins, o o, the whole being arranged and applied together and to the frame of the machine, substantially in manner and so as to operate as specified.

Also, the arrangement of the latch lever, k1, and the cam, m1, with the wheel, L, its notch, l1, and the shaft, N, such latch lever, k1, being for estopping the wheel, L, as set forth.

Also, the combination as well as the arrangement of the nipping and cutting levers, w x, and their operative mechanism, with the wheel, L, such operative mechanism being the plate, O, and its cams, z a1, and the springs, b1 c1, the stud, d1, the latch, e1, notches, f1 g1, the lever, n1, stud, o1, arm, p1, and stud, q1.

Also, the combination for operating the dog, S, or moving it lengthwise on the pinion, q2, such consisting of the cam plate, x3, and the studs, y3 z3, of the gear, a3, and in combination with the cam plate, x3, and its dog, S, the spring bolt, a4, and the notches, b4 c4, arranged as explained.

Also, the combination of the pinion, p5, the curved rack, q5, the lever, r5, the cam, s5, and the spring, t5, or their equivalents, with the retractor, t1, combined with mechanism for twisting wire, and having mechanism for operating such retractor in other respects, substantially as set forth.

Also, the combination of the auxiliary twister, V (provided with mechanism for operating it as described) with the two twisters, T U, to operate together and with the retractor, and provided with mechanism for operating them as specified.

Also, the twister, T, as composed of the head, d4, the jaws or slides, l4 l4, the flanged wheel, f4, the cammed lever or slider, K4, the studs, m4 m4, and slots, n4 n4, the whole being arranged substantially as described.

Also, the combination of the screws, p4 p4, with the twister, T, made substantially as described, the purpose of such screws being to adapt the twister to operate on wire of different sizes.

Also, the application or arrangement of the slide jaw, i5, the lever, m5, and its spring, n5, with the lever, d5, applied to the bar, c5, as and for the purpose specified.

Also, the combination and arrangement of the spring, f8, or its equivalent, with the mechanism for making the heddle, such spring, when the heddle may be resting on the inner stationary jaw of the bar, c5, being used to press the heddle down a little, as and for the purpose hereinbefore mentioned.

Also, the combination of the discharger, u5, (provided with mechanism for operating it as described) with mechanism for making the heddle, as specified.

Also the conductor, W, made substantially as described.

Also, the combination for actuating the tongue, v1, of the retractor, t1, in order to enable a heddle to be removed from the retractor, and the tongue to close upon the next succeeding piece of wire introduced into the retractor, such combination consisting of the slider, w1, the spring, x1, the lever, m2, and the cam, o2, also their combination with the retractor and its tongue.

77,714.—HARVESTER.—Caleb Caldwell, Waukegan, Ill.

I claim, 1st, The double joint, T, in combination with the motion lever, R, and pitman, V, arranged to operate substantially as specified.

2d, The combination of the oscillating frame, Q Q, cam wheel, W, strap, i, motion lever, R, double joint, T, and pitman, V, all arranged as and for the purpose herein specified.

3d, The lever, a, attached to the tongue, J, in combination with the catch, c, chain, 23, and rod, 22, arranged to raise the front of the harvester, as described.

4th, The arrangement of the rods, C D, brace, G, lever, E, catch, F, and shoe, B', for raising the cutter bar, U, substantially as described.

77,715.—SEWING MACHINE.—C. Chabot, Philadelphia, Pa.

I claim, in combination with a removable and replaceable throat plate, a push piece that fastens, unfastens, raises, and holds up said plate, substantially as and for the purpose described.

Also, in combination with the shuttle and its bobbin, the spring, i, when pivoted to swing laterally, and embossed at both of its ends, for holding and allowing the bobbin to be removed by the side movement of the spring, as also for regulating the tension of the bobbin thread by means of the set screw, r, substantially as described.

Also, in combination with the latch, D, the concealed spring bolt, t, for holding said latch in either position, that is, open or shut, substantially as described.

77,716.—STORE WINDOW.—Henry Chamberlain, Dayton, Wis.

I claim the combination of the spring bar, A, the perpendicular bars, a b c and d, the plate, C and D, of a store window, when constructed and operated substantially as described and for the purpose set forth.

77,717.—BOOTS AND SHOES.—Edwin Chesterman, Boston, Mass., assignor to himself and Edwin A. Eaton.

I claim a boot or shoe, whether made of leather or other material, having a lining fabric, one of whose sides consists of a loose, shaggy or woolly material, when such shaggy side is placed towards the upper or outside of the boot or shoe, for the purpose of securing warmth and ventilation, as specified.

77,718.—CONDENSER FOR SPIRIT STILL.—Paxson Coats, Cincinnati, Ohio.

I claim the worm, B, having its lower end, b, terminating in the reservoir, C, from which extend the pipes, E and D, the one up and the other down, in combination with the vat, A, when the same are constructed and arranged in the manner substantially as and for the purpose specified.

77,719.—MOWING MACHINE.—Marcellus V. Cumming, Winthrop, Me.

I claim, 1st, The combination of a cutting apparatus, M, a wheeled carriage and a steam engine applied to both, so as to put them in operation under circumstances and substantially in manner and for the purposes as hereinbefore explained.

2d, The combination of an auxiliary wheel carriage, O, and mechanism as described (viz., the chain, R, and wheels, S S'), or its equivalent, for revolving its axle with the mowing machine, its wheel carriage and steam engine applied to both, so as to put them in operation, substantially as and for the purposes set forth.

77,720.—BED BOTTOM.—J. D. F. Dahl, Milwaukee, Wis.

I claim the combination of the frame, B, provided with the guide rods, C, and the frame, A, with the springs, D, cords, G, and pulleys, F, all constructed and arranged to operate as set forth.

77,721.—HAY RAKER AND LOADER.—Matin A. Dilley, Mendon, Mich.

I claim, 1st, The hinged box, e e, and universal joint, j, in combination with the frame, F, guide bar, K, and winding drum, H, the several parts being constructed and arranged substantially as and for the purpose herein specified.

The arrangement of the lever, l, rod, a, elbow lever, t, and rod, h, with the arm, m, and lever, M, for the purpose of automatically detaching the clutch, j, as herein fully described and for the purpose specified.

3d, The shaft, R, provided with the arms, L m m and n, in combination with the cords, b c and d, and winding drum, H, the several parts being constructed and arranged for the purpose of elevating the hay fork described, substantially as herein set forth.

77,722.—FURNACE AND PROCESS FOR THE MANUFACTURE OF IRON AND STEEL.—Francis Ellershausen, Montreal, Canada.

I claim, 1st, The furnace, in its novel combination of two fire chambers, b and l, separated by fire bridge, m, as shown in the two modifications, one chamber being a crucible fire chamber, and the other a reverbatory fire chamber, both in connection with the crucible, i, all working together, substantially in the manner and for the purpose described.

2d, The process of smelting and refining metals in large quantities and in short time, by the employment of a large crucible with discharge hole.

3d, The puddling of cast iron in a crucible placed in my furnace, and surrounded by fire, the product being cast steel, substantially in the manner described.

77,723.—HASP LOCK.—Joseph S. Elliott (assignor to himself and A. B. Cooley), Philadelphia, Pa.

I claim the bolt, B, operated by a spring, f, and projecting pin, i', as described, and the tumblers, F and G, secured within, and arranged to operate in connection with the said bolt and with each other, in the manner and for the purpose herein set forth.

77,724.—SEAMLESS LEATHER STRAP AND TUBE.—Alois Eschenlohr, Munich, Bavaria.

I claim, 1st, The method of skinning the animal and cutting out the skin, as herein described and illustrated in fig. 1, sheet 1, of the accompanying drawings.

2d, The method of skinning and cutting out the skin of the animal, so as to form endless belts or straps of great length, in the manner herein described, and illustrated in fig 2, sheet 1, and figs. 1 and 3, sheet 2, of the accompanying drawings.

77,725.—CANDLE.—John Lyon Field, Kensington, Great Britain.

I claim a candle, having one or more ribs or projections near its lower end, substantially as and for the purpose described.

77,726.—PAN FORMER.—John Finn, Decorah, Iowa. Antedated April 24, 1868.

I claim, 1st, The recesses, E, and blocks, F, as herein specified.

2d, Extension block, D, and bolt and slot, J, substantially as described.

3d, Lever or cam, G, for the purpose set forth.

77,727.—MANUFACTURE OF VINEGAR.—Joseph Firmenich, Buffalo, N. Y.

I claim the process of making vinegar from grain and other starch producing substances as a whole substantially as herein specified.

Also, as a part of the process of making vinegar, the injection of steam into the digesting mass of meal or grain, as in the vats, G and I, substantially as herein set forth.

Also, as part of the process for making vinegar, the soaking and digestiug of grain without grinding, as in the vat, I, substantially as herein described.

Also, as part of the process of making vinegar, the subjection of the soaked meal or grain to the smooth squeezing mill, J, substantially as herein specified.

Also, as part of the process of making vinegar, the method of applying the sulphuric acid, first with cold water and then with boiling water, and the injection of steam into the latter while adding the starch, and until it is converted into glucose, substantially as herein specified.

Also, as a part of the process, the method of conducting the vinous fermentation by successive additions of yeast, first weak and then strong, substantially as herein described.

Also, the arrangement of the sieves, K and L, substantially as and for the purpose herein set forth.

Also the gage valve, m n, for drawing off the clarified sirupy liquid, substantially as herein described.

Also, the construction of the acetic generator, substantially as herein set forth.

77,728.—ANKLE OR KNEE GUARD.—Henry A. Hall, Boston, Mass.

I claim, as a new article of manufacture, an ankle or knee guard, in which the band or belt is provided with a series of independent and separate feelers of vulcanized rubber, constructed or formed in the manner herein shown and specified, so that each feeler shall be uniformly flexible in various directions.

77,729.—LIGHTNING ROD.—William Hall, Dubuque, Iowa.

I claim a continuous convoluted cylinder, constructed of sheet metal, wherein the sheet of which it is composed shall extend more than once around the axis in forming the cylinder, whether the same shall be constructed over an iron wire or not, when the same is made substantially as and for the purposes herein set forth.

77,730.—IRON FURNACE.—Alexander Hamar, New York city.

I claim, 1st, The method, herein described, of injecting steam, superheated steam, or hydrogen into the oven, to mingle with the gases, and increase their heating effect on the hot blast pipes.

2d, The arrangement, in a large combustion chamber, of the hot air pipes, as and for the purpose described.

3d, The combination, substantially as set forth, of the hot air pipes with the interposed deflectors, r, for the purpose described.

4th, The combination, substantially as set forth, of the mixing chamber, the combustion chamber, and the hot air pipes.

5th, The arrangement, as set forth, of the superheating pipes, f, in the combustion chamber and above the air pipes, for the purpose specified.

6th, The arrangement of the steam pipe within the hot blast pipe, to maintain the steam at high temperature.

7th, The arrangement of the steam and blast pipes in sets, at different levels, for the purpose specified.

77,731.—CLOVER SEPARATOR AND HULLER.—David M Heikes, Franklin Township, Pa.

I claim the combination of the breaking device, e f, elevator, G, riddle, H, conveyor, J, platform or board, I, hulling device, k l, sieves, M N Q, fans, O P, and delivering spout, R, all arranged substantially as described.

77,732.—BEER COOLER.—Nicholas Hiemens, Buffalo, N. Y.

I claim a beer cooler, composed of an ice chamber, A, having an open inclined trough, C, formed upon the outside walls thereof, in the manner and for the purpose substantially as herein described.

77,733.—SCAFFOLD.—Edward R. Holzer, Philadelphia, Pa.

I claim, 1st, A scaffold, consisting of two or more posts, A, each hinged to a base, B, resting on the ground, and to each of which is secured an adjustable bracket, C, all substantially as described.

2d, The grooves, e, arranged in opposite sides of the post, for the reception of the bent ends of the plates on the brackets, as set forth.

77,734.—CHEESE VAT.—William Howard, Watertown, N. Y.

I claim, 1st, The combination, with outer and inner vats, of a fire chamber and heat and smoke conducting pipes, arranged about the sides of and between the vats, as and for the purposes set forth.

2d, The combination, with the heat and smoke conducting pipes and vat, of a damper, arranged as and for the purposes set forth.

77,735.—GATE.—H. Hunt, Delavan, Wis.

I claim, 1st, The combination of the levers, R R, pulley, O, and cords, F, arranged substantially as and for the purpose set forth.

2d, The combination of pulley, O, levers, R R, pivots, I J, and cap, P, arranged to operate substantially as herein set forth.

77,736.—TAX CALCULATOR.—I. S. Hyatt, Rockford, Ill.

I claim, 1st, In combination with tax table, A, constructed substantially as described, the sliding bar, B, operating in the manner and for the purposes as set forth.

2d, Providing the sliding bar, B, with the projections, b b, as and for the purposes set forth.

3d, Rendering the sliding bar, B, adjustable in a direction at right angles to the carrier, E, by means of a slot and set screw or their equivalents, for the purpose substantially as set forth.

77,737.—HARROW TEETH.—Alvarado Jones (assignor to himself and A. A. Sage), Westford, Wis.

I claim the hollow body, B, in combination with the solid steel point, A, in the construction of a harrow tooth, substantially as and for the purposes set forth, as a new manufacture.

77,738.—BED BOTTOM.—Blinn D. Joslin, M. D., and Reuben A. Newhall, North Brownville, Mich.

We claim, 1st, The truss, D, provided with supporting springs, 3, when attached to slat, C, and operating substantially as and for the purposes described.

2d, The combination of the trussed slats, C, with the rod, B, and hooks, J, upon the double coil spring, E, for the purpose described.

77,739.—HAY SPREADER.—G. G. Knowles, Wakefield, R. I.

I claim the combination of the eccentric plates, r r r r, with the triangles, t t t t, and bars, K V, as and for the purpose herein described.

77,740.—PADLOCK.—Frank F. Landis, Lancaster, Pa. Antedated May 7, 1868.

I claim, 1st, The rounded right-angled chamber or partition, I, with its wall, H, thickened and perforated, in combination with the hinged and winged tumbler, G E F, on its pivot, t, with a cylinder, J, revolving freely on the pin, O for the socket in the key, arranged and operated in the manner specified.

2d, In combination with said chamber or partition, I H, and tumbler, G E F, the arrangement of the lever, C, with its hook, D, in connection with the spring bolt, B, by the pin, b, when actuated in the manner and for the purpose set forth.

77,741.—BRIDGE.—George T. Lape, Summit, N. Y. Antedated April 28, 1868.

I claim, 1st, The construction of sections or voussoirs, consisting of abutting ends, flanges, rib, and cross plate with tongues, grooves, and dove tails all arranged substantially as and for the purposes specified.

2d, The construction of bridges, arches, etc., by combining a series of sections or voussoirs, and securing them to each other, substantially as herein specified.

77,742.—TOOL POST FOR LATHE OR PLANING MACHINE.—William H. Leach (assignor to himself and Bradford Stetson), Uxbridge, Mass.

I claim the construction of a tool post, for a lathe or other machine, with the joint, A' B', in combination with the collar, C, and set screw, F, substantially as and for the purpose set forth.

77,743.—CASTER FOR FURNITURE.—Samuel N. Long, South Chatham, assignor to himself and Lincoln B. Bearse, Barnstable, Mass.

I claim the combination of the sleeve, D, with the spindle, A, with the plate, B, having the groove, c, and the opening, g, all constructed, arranged and operating as and for the purpose described.

77,744.—SAFETY HATCH.—Robert H. Martin, Staten Island, N. Y. Antedated April 25, 1868.

I claim, 1st, The combination with a hatchway-hoist to the several floors, or any of them, of a warehouse or other structure, of partially balanced or counterpoised safety guards, substantially as specified.

2d, The combination with rising and falling or opening and closing safety guards to a hatchway on any or all of the floors of a building, of self-shooting bolts on the hoist, operating automatically to open the guards, both in the ascent and descent of the hoist, essentially as shown and described.

3d, Providing the hoist with unshipping or back locking gear to its self-shooting bolts, for operation at pleasure, of the latter with any one or more of the safety guards without hitting the others on intermediate floors, or for running the hoist up and down the hatchway without stopping at or raising any of the guards, substantially as herein set forth.

77,745.—ATTACHING DOOR KNOBS TO SPINDLES.—Thomas Marvin, Middlesex county, Mass.

I claim the combination of the stationary escutcheons, the spindle, the spindle sockets, with the shoulder, h, and flange, i, the disks and the knobs, when constructed, connected, and relatively arranged substantially as described.

77,746.—PURIFYING SORGHUM JUICE.—Wm. Matthews, Troy Township, Ohio.

I claim the improved filterer herein described, composed of the vessels, b c d, or their equivalents, arranged and charged with filtering materials substantially as described.

77,747.—HUB FASTENING FOR ECCENTRICS.—Geo. W. Miller, and Julius D. Stevens, Scranton, Pa.

I claim the dies, C C, and which are secured within the hub of the eccentric, and made to clamp the shaft by means of a bolt with a tapering head, or other equivalent, as and for the purpose set forth.

77,748.—SHUTTER FASTENING.—W. J. Miller, Gettysburg, Pa.

I claim the arrangement and combination in a shutter fastening of the pull, P, bent arm or trigger, E, rod, j, spring, i, catch, b, and plate, a, with its projecting catch, operating in the manner as shown and described and for the purpose set forth.

77,749.—GAS BURNER.—Hypolite Monier, Paris, France.

I claim, 1st, The combination with a gas or other burner, such as herein described, of an internally fluted cone or chimney rest, of glass or other transparent material surrounding the same, and a cap, R, or its equivalent, the whole being constructed and arranged as specified, so that air shall pass to the flame through the interior of the burner between the burner and the cone, and between the cone and the chimney, as and for the purposes set forth.

2d, The combination with the burner of the internally fluted glass cone and chimney seat, and the corrugated and fluted glass tip applied to the said cone, in the manner and for the purposes shown and specified.

77,750.—CLOTHES LINE HOLDER.—Henry Morgan, Springfield, Mass.

I claim the combination of the pulley, A, and cam, B, with the gear, c c when arranged upon a plate, C, substantially in the manner and for the purpose shown.

77,751.—COOKING STOVE.—B. L. Mott, Jr., Pawtucket, R. I.

I claim the combination and arrangement of the arched plate, H, with the soot drawer, G, so as to divide such drawer or the chamber, E, into two connected or return flues, as set forth, and be movable with the drawer.

Also the combination of the lip or flange, a, with the partition or arched plate, H, or the same and the drawer, G, to be applied to the chamber, E, and flues, D F, of the cover, as specified.

77,752.—MEAT POUNDER AND ICE PICK.—George Murray, Jr., Cambridge, Mass.

I claim as an article of manufacture a combined meat pounder, cleaver, ice pick, fish scaler, etc., composed of a rectangular shaped plate, of cast or malleable iron, A, one side of which is covered with pointed projections, while from the other side projects a handle, B, and having one edge, C, and end, D, sharpened, so as to produce cutting edges, substantially as herein set forth.

77,753.—CHURN.—Esau P. Newman, New Albany, Ind.

I claim the breakers, J J J J, and steel wire springs, K K, as used in connection with the paddles, I I I I, in churning butter.

77,754.—WAGON LOCK.—Chas. Noethlich, Muscatine, Iowa.

I claim the arrangement and construction of the angular lever, G G', link, and pivoted pawl, D, in combination with the bevel toothed rack, A, and vibraring lever, B B, the arrangement of the whole being such that the pivot, c, can be turned to the right or left of the line, x x, and when in one position the pawl will be firmly locked without the aid of an auxiliary stop, and when in the other position the pawl will be unlocked, all substantially in the manner described and shown.

77,755.—OIL CAN.—James Ogden, Philadelphia, Pa.

I claim the combination and arrangement of a can, A, pipe, G, socket, B, having openings, f and, i, and a plug, D, fit ing the said socket, and having passages, e m, and a spout, E, all substantially as described.

77,756.—LIFTING JACK.—Samuel Perry, Seaford, Del., assignor to himself and John L. Coulborn.

I claim the arrangement of the standard, A, with its slotted arm C, through which passes the rack, F, and to which is pivoted a loop, d, said rack being operated by the lever, D, passing through the standard and kept in position by the bar, E, and block, c, all constructed and used as specified.

77,757.—SUSPENSORY BANDAGE.—W. H. Phelps, Boston, Mass.

I claim as a suspensory bandage constructed and adapted for being used substantially as described and shown.

77,758.—MEDICINE.—Samuel Pitcher, Barnstable, Mass.

I claim the composition substantially as described, and for the purpose as explained.

Also the process hereinbefore described for compounding the ingredients of such composition, such process embracing the two operations of straining the liquor from the leaves, and subsequently obtaining, by pressure of them, one extract, not obtainable by simple infusion.

77,759.—STENCIL PLATE.—Wm. W. Potter, Buffalo, N. Y.

I claim, 1st, A slotted plate, A, attached to the stencil plate, B, at one end while the other end is free, substantially as and for the purposes set forth.

2d, The combination of the slotted plate, A, stencil plate, B, the C-formed letters sliding on plate, B, and the latch, D, substantially as and for the purposes described.

77,760.—HORSE HAY FORK.—S. H. Rhoads, Clyde, Ohio, and Wm. Carroll, Hillsdale, Mich.

We claim, 1st, The springs, b', in combination with prongs, E, for the purpose specified.

2d, The catches, a b, and springs, c d, as constructed and arranged to operate in combination with the shaft, C, for the purpose specified.

77,761.—COTTON PLANTER.—Charles Richmond (assignor to Gaynor, Stiles, & Co.), Memphis, Tenn.

I claim in the adjustable flanges whereby they can be separated or closed at will, for the proper distribution of seed, the separators to keep the seed disunited, in order to distribute equally and regularly, together with the hollow journals, allowing the whole to revolve and adapt itself.

77,762.—STRAW CUTTER.—James Riley, Detroit, Mich.

I claim the arrangement of the sliding frame, C, with feeder, A', when used in combination with the revolving cutter, D, and hopper, L, and operated in the manner substantially as and for the purposes herein set forth.

77,763.—PAINT FOR LIQUID COMPASSES, ETC.—Edward S. Ritchie, Brookline, Mass.

I claim the application to a compass card, or other article to be exposed to alcohol or an alcoholic mixture, as set forth, a paint composed of one or more pigments and coagulating material (such as albumen, for instance), and then, or subsequently, effecting coagulation of the vehicle, the whole being substantially as and for the purpose above specified.

77,764.—LAST AND SHOE HOLDER.—Andrew J. Rock, Union Village, Va.

I claim the arrangement and combination of the adjustable posts, C, screws D E and K, blocks, A and G, when adjusted and operated with the adjustable jaws, J J, as herein described and for the purposes set forth.

77,765.—FRAME FOR NECK TIES.—S. W. Roof, New York city.

I claim the combination of the frame, A, with the clasp, made detached, as shown at B, or hinged to said frame, as set at C, when the frame, A, is made as show, so that its ends, when in use, pass up under the outer ends of the turn-down collar, with which it is worn, so as to hold it in its place, all substantially as shown and described and for the purpose specified.

77,766.—SIDEWALK.—Samuel I. Russell, Chicago, Ill.

I claim, 1st, The construction and arrangement of sidewalks or other ways with frame work or supports or combined with and covered by a surface coating composed of coal tar, and grooved, substantially as specified.

2d, The construction and arrangement of the walk in sections, substantially as described.

77,767.—LAMP WICK.—Eilert O. Schartau (assignor to Frank S. Judd and John G. Powell), Philadelphia, Pa. Antedated April 28, 1868.

I claim a wire gauze or perforated metallic case, of any shape, fastened permanently to the top of a lamp wick, of any material, or so constructed as to be folded on it and detached at convenience, for the purpose of guarding the wick from the carbonizing effect of the flame, thereby producing a clearer light and a saving of wick and oil, as herein set forth.

77,768.—TRANSPORTING AND KEEPING GRAIN AND OTHER PRODUCTS.—S. F. Schoolmaker, New York city. Antedated April 26, 1868.

I claim, 1st, A close chamber or compartment rendered impervious to air and gases by a metal lining, so applied as to permit the free expansion and contraction of the metal, substantially as and for the purpose specified.

2d, In connection with a suitably inclosed chamber or compartment, nitrogen gas, when produced from the confined air, by the agency of a chemical compound and heat, without the production of carbonic acid gas, substantially as and for the purpose described.

3d, Providing an opening or inlet, in connection with an inclosed chamber

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for the passage of exterior air, to maintain in the process an equilibrium of pressure within and without, for the purposes substantially as described.

77,769.—SHAFT COUPLING FOR CARRIAGES.—Anson Searls, New York city.

I claim, 1st, The shaft hook, A, with a recess, C, in the back part of it, and hole for bolt, L, as set forth.

2d, The curved T head bolt, I, for the purposes described.

3d, The combination of the bolt, I, spring, R, washer, J, and nut, E, in combination with the hook, A, and pin, B, substantially as described and all for the purposes set forth.

77,770.—COTTON BALE TIE.—G. A. Seaver, New York city.

I claim the construction of the tie or fastening substantially as described.

77,771.—INSTRUMENT FOR LIGHTING GAS, ETC.—Amos Shipley and Wm. T. Mersereau, Newark, N. J.

We claim in combination with a standard, a movable frame work supporting the corrugated lips, when the same shall be constructed and operate substantially as described, for the purposes set forth.

77,772.—TUBE WELL.—S. E. Skilling, Benton Harbor, Mich.

I claim the coil spring, G, provided with the rod, H, the collars, E and I, and the nut, J, within the pipe, A, substantially as arranged and for the purposes hereinbefore described.

77,773.—DENTISTRY.—Edward C. Smith and David F. Wilcox, Greenville, N. Y.

I claim, 1st, The introduction of air between the surface of the mouth and the material used in taking impressions for artificial bases for teeth, by means of air tubes, T t, valve rod, V, and spring, S, substantially as set forth.

2d, In combination with the impression cup, C, the tubes, t T, valve rod, V, and coil spring, s, when arranged and operating substantially as and for the purposes set forth.

77,774.—SINKER FOR FISHING LINE.—William H. Smith (assignor to himself and Israel Hecker), New York City.

I claim making a sinker in two parts, and in such a manner that sections or disks may be added to or taken from it, for the purpose of increasing or diminishing its weight, substantially as herein set forth.

77,775.—HOP TRELLIS.—Lorenzo D. Snook, Barrington, N. Y.

I claim the horizontal poles, D and E, when supported at right angles upon the upper sections, B, of the stakes, as specified, by means of the hooks, K, and used in combination with the sectional stakes, A B, substantially as and for the purpose set forth.

77,776.—SHINGLE MACHINE.—George W. Southwick and John H. Gillett, Scott, N. Y. Antedated May 4, 1868.

We claim the arrangement of the bar, N, with its grooves, P P, through which pass the pins, S S, said bar being operated by the lever, q, for oscillating the bar, J, through its arm, K, substantially as and for the purpose specified.

77,777.—PROCESS FOR TREATING WOOD.—Edward Spaulding, Brooklyn, N. Y.

I claim the method of treating wood herein described, consisting essentially in subjecting it to sufficient pressure to change and compact the structure preparatory to the process of drying by artificial heat, substantially as set forth.

77,778.—CONSTRUCTION OF BLACKING BOX.—Thomas H. Spencer (assignor to Charles L. Spencer), Providence, R. I.

I claim a double hinge, when applied to a blacking box and cover, in connection with a handle, substantially as described, and for the purpose set forth.

77,779.—SAW HORSE.—Augustus Stanley, New Britain, Conn.

I claim the folding parts, A A B C, notched or recessed across, and adapted to lock into each other, and be rigidly confined at the proper angle by the aid of the screw brace, D d d', or its equivalent, substantially as and for the purpose herein specified.

77,780.—ROTARY STEAM ENGINE.—Albert I. Thunell and John M. Hedstrom, Buffalo, N. Y.

We claim the arrangement of the concentric steam grooves, f f', passage or passages, g, and blank, n, when combined with the piston head, B, and steam pipes, E G, in the manner and for the purpose specified.

Also, in combination with the wing, D, the spring slide, D', with right angled packing edge, a, arranged and operating as herein set forth.

Also, in combination with the valve C, the crank arm, H, connecting bar, I, rock lever, K, and cam pin, m, the whole arranged and operating as herein set forth.

77,781.—MODE OF LETTERING MARBLE.—Jules Turel, Kendalville, Ind.

I claim the process, substantially as herein described, for applying metallic lettering to marble or other stone.

77,782.—KING BOLT FOR WAGON.—John J. Waldron, East Durham, N. Y., assignor to himself, Timothy G. Palmer, and Henry Brown.

I claim the socket, l, projecting downwards from the plate, f, that unites the perch, e, and bolster or head block, d, in combination with the king bolt, i, that enters, at its upper part, said socket, l, and is retained by the nut, o, above said plate, f, as and for the purposes specified.

77,783.—BLOTTER.—David Walker, Newark, N. J.

I claim the thin strip of metal or hard substance, a, constructed, adapted, and attached to the blotter, in the manner and for the purpose specified.

77,784.—WAXING FLOORS.—R. B. Walker, Claremont, N. H.

I claim the combination of the beeswax, spermaceti, and paraffine, or its equivalent, in such proportions that the whole may be reduced to powder, substantially as and for the purpose set forth.

Also, the method or process, herein described, of waxing floors, by sprinkling thereon a waxing material, when the same is in a dry or pulverized or powdered state.

77,785.—MODE OF ATTACHING HUBS TO AXLES.—James Weathers, Greensburg, Ind.

I claim the thimble, B, and skein, E, cast of one piece, the former provided with a flange, h, and secured to the axle, A, by means of the bolt, f, and rod, g, all combined, arranged, and used substantially as specified.

77,786.—STOVE FOR RAILROAD CAR.—E. Z. Webster, Louisville, Ky.

I claim the slides, M and O, in combination with the hopper, N, for supplying coal to the furnace, substantially as herein described.

Also, the combination of the furnace, A, casing, H, valves, I and G, smoke and hot air flues, D and K, slides, M and O, and hopper, N, for the purpose, and substantially as herein specified.

77,787.—TRUNK LID SUPPORTER.—Samuel Wehrly, San Francisco, Cal.

I claim, 1st, The spring, B, having a hole, a, near its upper end, for the purpose of receiving the point, D, substantially as described.

2d, The catch, E, having a point, D, formed by making a slot on its top, substantially as and for the purpose described.

77,788.—FRAME FOR NECK TIE.—Patrick Welch, New York, N. Y.

I claim the neck tie frame, formed with a slot running from the upper part down the center of the body, for the purposes as set forth.

77,789.—CHURN DASHER.—John E. Williams and Michael Lemon, Binghamton, N. Y.

We claim the combination of the dasher, A, center hinged valve, F, hollow shaft or dasher rod, C, and oblique openings, E E, through the edges of the wings, all being constructed substantially as herein described and represented for the purpose set forth.

77,790.—BOILING AND PUDDLING FURNACE.—John I Williams, Etna, Pa.

I claim, 1st, The hollow cast iron water chill boxes, a a, of a puddling or boiling furnace, made with rounded back corners, and jambs, b, in front, substantially as and for the purpose hereinbefore described.

2d, The use of hollow water boshes or boxes, connected with a water reservoir or tank, of suitable capacity to keep up a circulation of warm water, as well between heats as when the furnace is in operation, substantially as hereinbefore described.

77,791.—SEAT FOR VEHICLES.—L. W. Wolfe, Jacksonville, Ill.

I claim the arrangement of the seat, A, with the hollow concavo convex metallic corners, B B, as herein described, all constructed and used substantially as set forth.

77,792.—FINISHING SKINS AND LEATHER.—George T. Woodbury and Thomas Burch, Newark, N. J.

We claim, 1st, A metallic or other roller, provided with such marks, promiuences, and depressions as will produce, when passed over leather, under pressure, an imitation hog skin.

2d, The means of producing an imitation of the dressed skin of a hog upon leather adapted thereto, by the use of a roller, prepared and employed substantially as described.

3d, An imitation hog skin, when produced by the use of a metallic or other roller, having engraved, indented, transferred, or otherwise prepared upon its circumference, such marks, depressions, and projections as will secure a representation of the marks left by the removal of bristles and otherwise, when pressed upon and revolved over leather, the whole substantially as described.

77,793.—ALLOY FOR THE MANUFACTURE OF SPOONS AND FORKS.—Howell W. Wright (assignor to Reed and Barton), Taunton, Mass.

I claim the within described alloy, or composition of metals, or any other substantially the same, all as and for the purposes set forth.

77,794.—RAILWAY CHAIR.—Reuben Zider, El Paso, Ill.

I claim the arrangement of the clamps, B B, and key, D, with the chair, A, the several parts being constructed substantially as described, thus forming an improved railroad chair.

77,795.—CUPOLA FURNACE.—Federal C. Adams, Cincinnati, Ohio.

I claim, 1st, The general shape of the interior of a cupola furnace, as is described, that is to say, gradually contracted from the bottom to a point above the tweers, and thence gradually enlarged to the top, as shown.

2d, The heating chamber, A, above the cupola, provided with openings, B, and door, C, with the base wall, H, projecting over the lining, substantially as shown.

3d, The air heating chamber, F, under the wall, H, and between the lining and the outer case, with the openings for the introduction and discharge of air, substantially as described.

4th, The plate, J, in the chimney, with its smoke passages, substantially as shown, and for the purpose described.

5th, The outer case, L, forming a blast heating chamber, N, surrounding the cupola, substantially as described.

6th, The partitions, O O1 O2 O3, in the blast heating chamber, N, substantially as and for the purposes described.

7th, The space or chamber between the lining, E e, and the inner case, for the purpose of cooling the back of the lining, or heating the blast, substantially as described.

8th, The cupola lining, E e, composed of an iron plate or plates covered with fire clay or other non-conductor, as described.

9th, Arranging the tweers in a cluster, as shown by, P Q R S T.

10th, The arrangement of tweers on an angular or spiral line, as shown by the combination, P Q R S or R S U V.

11th, The tweers set at an angle to a radial line, as shown at W, for the purpose of creating a tangential or vertical blast, as described.

12th, The arrangement of tweers, having the same size at the outlet, one above the other, in regular or irregular order, substantially as and for the purpose described.

13th, The tweers, Y Y, projecting beyond the lining toward the center of the cupola, as described.

14th, The employment, in a cupola furnace, of slotted tweers for the admission of the blast.

15th, The slotted tweers constructed with the lower part of the outer end wider than the upper part, and projecting beyond the lining, substantially as shown.

16th, The horizontal slotted tweers, constructed substantially as shown.

17th, The upright center tweer, Z, surmounted by a cap, Z', whether introduced through the bottom or from the sides of the cupola, substantially as described.

18th, So arranging the tweers of a cupola furnace, as to employ a greater number below than above, for the purposes described.

19th, The upper row of tweers, W W W, substantially as and for the purpose described.

20th, The combination, in the same cupola furnace, of tweers of different shapes and sizes, and located above and below each other, substantially as set forth.

21st, The inclined supports of the cap of the center tweer, Z, for the purpose of introducing the blast with a vertical motion, as described.

22d, In a horizontal series of tweers applied to a cupola furnace, constructing the inlets of unequal size, as described.

23d, In a series of tweers placed one above the other, making some of them with the outer end of a greater diameter than the others, while the inner end remains of the same diameter, as described.

24th, The horizontal line of tweers, R3 R2 P T S S2 and S3, increasing and diminishing, substantially as shown.

77,796.—CARRIAGE POLE TIP.—Alonzo Benedict, Albany, N. Y.

I claim the pole tip, A B, substantially as and for the purpose described.

77,797.—SHAFT FOR VEHICLES.—William L. Blaisdell, Port Byron, N. Y.

I claim, 1st, The hollow foot, B, of iron or other metal, when arranged as described, for the purpose of uniting the shaft and cross bar.

2d, The combination of the hook, D, and shoe, E, with the springs, e and F, and foot, B, all arranged and operating substantially as described for the purpose set forth.

77,798.—STUMP EXTRACTOR.—Isaac J. Bogert, Fayette, assignor to himself and S. C. Crosby, Manchester, Iowa.

I claim, 1st, The combination of the head block or frame, A, inclined legs, B and C, cylinder, F, and toothed wheel, G, with each other, substantially as herein shown and described, and for the purpose set forth.

2d, In combination with the above, the feet, N, pivoted to the lower ends of the supports, B, substantially as described, for the purpose specified.

3d, The combination of the lever, I, and hooked pawl, J, with the toothed wheel, G, substantially as herein shown and described, and for the purpose set forth.

77,799.—FLAME AERATOR.—C. L. Browne, Washington, D. C.

I claim the wedge shaped bar, a a a, grooved on its periphery or exterior edge, and so placed on the burner that the ends or mouths of the groove are below the lowest point of combustion, substantially as and for the purposes herein described.

77,800.—SUSPENSION BRIDGE.—Edward M. Carpenter, Middletown, N. Y.

I claim, 1st, The construction and arrangement of the frame of a bridge, of separate sections, B B and B', in combination with the wedges, F F, substantially as herein shown and described.

2d, The wedges, F F, combined with the screw rods, e, and nuts, g, substantially as and for the purpose herein shown and described.

77,801.—EXTENSION FOR TABLE.—De Lance Cole, Marshall, Ill.

I claim the combination of the extension leaf or leaves, F, provided with legs, H, dowel pins, G, and supporting bars, I, with the hinged leaf or leaves, L, and slotted side bars of the frame, A, of an ordinary table, substantially as herein shown and described and for the purpose set forth.

77,802.—WHEAT DRILL.—J. W. Davidson, Mount Auburn, Ill.

I claim, 1st, The seat, K, when its forward end is supported upon the adjustable cross bar, C, carrying the seed tubes by the bars, M, all arranged as described, for the purpose specified.

2d, The adjustable shoes, B, when provided with short vertical tubes at their rear ends to receive the flexible tubes, D, said shoes being held in place and connected to each other by means of the cross bar, C, secured to the short tubes, all arranged as described, for the purpose specified.

77,803.—TOBACCO PIPE.—Henry G. Dayton, Maysville, Ky., assignor to Richard H. Collins, Cincinnati, Ohio.

I claim, 1st, As a new article of manufacture, a bowl, D, with a perforated side, so that it can be inserted into the main bowl of a pipe.

2d, A tobacco pipe, consisting of a bowl, A, without a bottom, and with a socket, B, of a removable bowl, D, which is held in place by means of the tube, C, substantially as herein shown and described, and for the purpose set forth.

77,804.—THILL FASTENER.—Lyman Derby, New York city.

I claim, 1st, The combination of the slotted bolt, C, with the ear pieces, B, whether attached to the clip, A, or jack plate, for securing the clip upon the axle, as sometimes used, for the purpose hereinbefore set forth.

2d, In combination with the slotetd bolt, C, the tenoned or wedge shaped thill iron, E, having an oblong hole, F, in it, substantially as hereinbefore set forth, and for the purposes described.

3d, In combination with the tenon shaped thill iron, E, having a slot or hole, F, in it, the spring latch, G, substantially as described, and for the purose set forth.

77,805.—LIQUID EXTRACT FROM VEGETABLES.—Gustave De Villepoix, Abbeville, (Somme,) and Joseph Francois Bonnaterre, Paris, France.

We claim, 1st, As a new article of manufacture, the herein described liquid extract of vegetables, as and for the purpose described.

2d, The herein described process for preparing the said liquid extract of of vegetables, as and for the purpose described.

3d, The combination, with the said liquid extract of vegetables, of a solution of salt and sugar, substantially as and for the purpose described.

77,806.—PRESERVING THE WOOD OF COFFINS.—Jean Maurice Dufournet and Louis Clemendot, Paris, France.

We claim, 1st, Rendering the wood indestructible, by coating it over with any antiseptic matter.

2d, Covering the coated wood with metallic sheets or suitably prepared papers, so as to obtain perfect air and water tight surfaces, substantially as and for the purpose herein specified.

77,807.—CORN PLANTER.—John Elbertson, Kirksville, Mo.

I claim, 1st, The combination of the rack, e, gear, e', plate, i, and roller, C, having one flat edge, substantially as and for the purposes set forth.

2d, In combination with the parts above referred to, the slide, D, and tube, A, when all said parts are constructed and arranged so as to operate together in the manner and for the purpose set forth.

77,808.—CORN PLANTER.—W. H. Fish, Jr., Scarsdale, N. Y.

I claim, 1st, The valve, e, in the spout, I, when arranged in connection with the seed slide, H, so as to be operated therefrom, substantially in the manner as and for the purpose specified.

2d, The fitting of the small front wheel, D, in an adjustable frame, E, secured to the front part of the frame, A, in the manner substantially as and for the purpose set forth.

3d, The combination of the two frames, A E, when used in connection with a seed dropping mechanism, substantially as shown and described.

77,809.—WATER INDICATOR AND ALARM.—Thomas Flinn, Brooklyn, N. Y.

I claim, 1st, The arrangement of the rods, E and F, connected so that the upper suspended rod, F, will only be operated by the lower floating rod, when the water in the boiler is at too high or too low a level, substantially as herein shown and described.

2d, The rod, F, when operated as described, in combination with the levers G H, and with the valve, B, all made and operating so that the valve will be opened both when the rod, F, is raised and when it is lowered, as set forth.

3d, The above, in combination with the pin, t, or other indicator on the floating rod, E, whereby the apparatus is provided with an index, as set forth.

77,810.—BRIDLE BIT.—Wm. S. Ford, Clinton, Ill.

I claim the tubes, B B, when formed as described, in combination with the bit mouth, A, and cheek straps, C C, as and for the purpose set forth.

77,811.—CORN PLANTER.—A. J. Going, M.D., Clinton, La.

I claim the arrangement of the colter, D, furrow opener, E, and standard, F, with the beam, B, as herein described for the purpose specified.

77,812.—LATHE.—Lewis Griscom, Mahanoy Plane, Pa.

I claim, for operating the cross-feed screw of a lathe, the combination of the feed screw with the pulley, E, band, b, bar, J, or its equivalent, all substantially as described.

77,813.—CHART ROLLER.—E. L. Hagar, Empire City, Colorado.

I claim the chart roller, constructed as described, consisting of the case, C, having the hinged lid, H, and adapted to receive the chart rollers, B, said chart passing through the curved opening, E, their operating cords, F, passing through separate openings in front of the charts, as herein shown and described.

77,814.—LINIMENT.—Wm. P. Hamlin, Exira, Iowa.

I claim a liniment, formed of the ingredients, in the proportions, and in the manner substantially as herein described.

77,815.—HEMP BREAKING MACHINE.—Joseph S. Hoskins, Spring Hill, Mo.

I claim, 1st, The lifting frame, F F', carrying the swords, C, the swords, D, upon the frame, A, and the swords, E, upon the springs, G, secured at g to the frame, and passing beneath the rollers, B, all constructed and operating as described for the purposes specified.

2d, The lifting frame, F F', swords, C D, yielding swords, E, and springs, G, in combination with the whipper, Q, feed rollers, B, pawl, R, and oscillating bar, P, substantially as described for the purpose specified.

3d, The whipper, Q, substantially as above set forth and described.

4th, The oscillating bars, P, carrying the whipper, Q, in their forked extremities, in the manner and operating substantially as above set forth and described.

5th, The pawl, R, in combination with the ratchet, T, and oscillating bar, P, operating substantially as above set forth and described.

77,816.—FIRE-PROOF SAFE.—A. W. Herr, Chicago, Ill.

I claim the fire-proof box, consisting of case, A, and box, B, each constructed and arranged, and both combined as described, the spaces between the same being provided with water evaporators, arranged in the manner herein described, or in any other suitable manner, and filled with fine salt or other bad conductor of heat, substantially answering the purpose herein specified, all combined and operating substantially as herein shown and described and for the purpose set forth.

77,817.—HAY RAKER AND LOADER.—S. R. Higgins, Parma, Michigan.

I claim, 1st, The two rollers, B H, in combination with the endless carrier, D, guard, F, the adjustable frame, C, and the main frame, A, all constructed and arranged to operate in the manner substantially as and for the purpose set forty.

2d, The revolving rake or picker, G, in combination with the rollers, B H, arranged substantially as and for the purpose specified.

3d, Constructing the revolving rake or picker with movable rake bars, t, arranged so as to be operated by the curved plates, u, and their own gravity substantially as shown and described.

77,818.—MANUFACTURE OF WHITE LEAD.—Otto Jacobi, Philadelphia, Pa.

I claim, 1st, An apparatus for producing carbonate of lead, consisting of the furnace, A, boiler, D, converter, G, and of the perforated boxes, I I, or their equivalents, all made and operating substantially as herein shown and described.

2d, The device set forth in the foregoing clause, in combination with the vinegar apparatus, F, arranged within the converter, as described.

3d, The pipes, B and J, in combination with the converter, G, all made and operating as described, the pipes being provided with dampers, c and d, respectively, as specified.

77,819.—COUNTERSINK.—C. Krebs, West Springfield, Mass.

I claim a countersink, having one or more bent lips, when constructed substantially as herein described and set forth.

77,820.—FINGER FOR SHUTTLE STOP ROD IN LOOMS.—E. S. Laney (assignor to himself and Enos Laney), Waterloo, N. Y.

I claim the improved finger herein described, when constructed substantially as and for the purpose specified.

77,821.—LAMP BURNER.—Gilbert Lavere, Bridgeport, Conn.

I claim, 1st, The combination of the central chamber, b, with the annular chamber, e, and wick tube, d, substantially as shown and described, and for the purposes set forth.

2d, The removable burner, substantially as shown and described, in combination with a rest, q, the said burner being so constructed as to be lifted off from the said rest, q, without unscrewing, all as set forth.

77,822.—FURNACE FOR BURNING FUEL FOR HEATING METALS, and for other Purposes.—T. J. Leigh, London, England.

I claim the combination of fuel in a bed of molten matter, and the construction and working of furnaces adapted to this purpose, as herein described.

77,823.—VULCANITE BILLIARD BALL.—W. H. Lippincott, Pittsburgh, Pa.

I claim forming billiard balls, and other balls of a similar nature, or for similar purposes, of successive layers of rubber, each layer being vulcanized as it is added, substantially as herein described.

77,824.—CRUTCH.—John A. Lobb, Independence, Mo.

I claim, 1st, The hollow staff, A, in combination with the hollow bar, a, the plug, d, and the spring, e, substantially as and for the purpose set forth.

2d, The hollow bar, a, in combination with the plug, d, the spring, e, and the clamps, e' e''.

77,825.—SAW SET.—A. Lyon, W. Shumard, and J. N. Robbins, Goshen, Ohio.

We claim, 1st, The chisel pointed punch, D d, so guided as to strike the teeth at their bases only.

2d, The tapering anvil, G g, adjustable to fit teeth of different widths, as explained.

3d, The combination of the anvil, G, supporting bar, I, punch, D, and stops or gages, F F', substantially as and for the purposes set forth.

77,826.—PAN FOR CONCENTRATING SULPHURIC ACID.—P. Marcelin and Joseph Saunders, Green Point, N. Y.

We claim providing sulphuric acid pans with elongated, downward-extending spouts, B, for the purpose of carrying the acid from the upper part of one pan to near the bottom of the next pan below, substantially as herein shown and described.

77,827.—PALLET FOR TIMEPIECE.—C. E. Mason, Elgin, Ill.

I claim the pallet block or stud, when slit or cut across from side to side, substantially as described, for the purposes specified.

77,828.—WASHBOARD.—Michael McGarry, Westfield, N. Y.

I claim the arrangement of the spring guides, B, and ways, b, connected by eyes, c, and bends, h, as described, when combined with washboard, A, and rubber, C C, as herein set forth.

77,829.—MACHINE FOR MAKING PAPER PULP.—Warner Miller, Herkimer, N. Y., assignor to National Wood Fiber Company, New York city.

I claim, 1st, The operating of the followers, E E', or, in other words, the feeding of the wood to the grindstone, by means of springs or a lever and weight, arranged substantially as herein shown and described and for the purpose specified.

2d, The particular application of the springs, I K, as shown, to admit of the followers being relieved of their pressure, whenever it is required to withdraw the followers for the insertion of the wood to be ground.

3d, The placing of two or more screens, P P', one above the other, in a shoe Q, placed in a suitable box, N, and having a shake motion communicated to it by means of a cam, R, or its equivalent, when such device is used in connection with or applied to a machine for making paper pulp, substantially as set forth.

4th, The curved spout or chute, T, attached to the upper screen, P, when said spout or chute is used in connection with a shoe containing two or more screens, and all arranged in such a manner as to admit of the dividing or separating of the pulp into two or more kinds or qualities of stock, substantially as set forth.

77,830.—REVOLVING SPADE PLOW.—J. W. Milroy, Galveston, Ind.

I claim, 1st, In a revolving spade plow, the hinged frame, D, operating substantially as and for the purposes set forth.

2d, The employment of one or more revolving plows or forks, arranged to operate substantially as described.

3d, The combination of the lower spade or forked wheels, R R, with the upper wheels, R' R', gearing therein, substantially in the manner and for the purpose set forth.

4th, The combination of the frame, A, roller, H, pawl, l, and cords, v v, all arranged and operating substantially as and for the purpose specified.

77,831.—CAR AXLE BOX.—A. H. Nathans and M. Thornton, Macon, Ga.

We claim the curbed packing, c, when arranged on the side of the plate, C, in the manner and for the purposes specified.

77,832.—FLOUR SIFTER.—John Novek, New York city.

I claim, 1st, A flour sifter consisting of the rotating cam shaft, B, levers, D E and F, and spring, G, in combination with the sieve, H, all made and operating substantially as herein shown and described for the purpose specified.

2d, In combination with the above, the support or supports, I, so arranged as to hold a barrel in an inclined position above the sieve, substantially as herein shown and described for the purpose specified.

77,833.—STONE-GATHERING MACHINE.—George N. Palmer, Greene, N. Y.

I claim, 1st, The broad shoe or scraper, formed with a series of grooves or channels, and having projecting points or fingers for gathering and conveying small stones, as herein described.

2d, The shoe, D, as constructed, in combination with a series of rakes, E, with spring teeth, e e, when secured to endless belts, F F, or chain gear, for loosening and picking up small stones from the surface of the ground, substantially as herein set forth.

3d, Hinging the grooved shoe or scraper, D, to the frame, A A, and controlling it by the springs, h h, in such a manner that it will adjust itself to the surface of the ground when in operation, substantially as herein described.

77,834.—MODE OF REMOVING METALLIC SCALE FROM GLASS and Moils.—Wm. P. Parrott, (Geo. Hughes, executor,) and J. J. Bordman, Boston, Mass.

We claim the employment of heat and a weak solution of sulphuric or muriatic and fluoric acids, in manner substantially as described, for removal of the metallic oxide or scale from the moils, or from the sand or silica used for making glass.

Also, for the purpose set forth, the combination of the vessel or tray, C, with the boiler, B, and the furnace, A.

Also, the combination as well as the arrangement of the acid generator, E, with the boiler, B, and the furnace, A, the said boiler and generator being connected, as described.

Also, the combination of the condenser, D, with the boiler furnace and the vessel, C, or the same and the generator, E.

77,835.—COOKING STOVE.—L. M. Parsons, Waukau, Wis.

I claim, 1st, The arrangement, as herein described, of the damper, K, with relation to the air passage, G, and oven, C, whereby the supply of cold air to the furnace, A, is cut off and directed through the oven to reduce the heat in the latter, and the supply of oxygen to the fire, as set forth.

2d, The arrangement of the air-supply flue, G, beneath the fire flue, a, of the stove, communicating with the furnace, A, through the ash pit when the stove is used with coal, and through the aperture, f, above the ash pit when used with wood, and whereby the cold air is heated by contact with the plate J, before reaching the fire, as herein shown and described for the purpose specified.

77,836.—VOTE REGISTER.—N. A. Patterson, Winchester, Tennessee.

I claim, 1st, The catching strips, G, or their equivalent, substantially as shown and described, in combination with the name blocks, B, and plate, A, or its equivalent, all as and for the purpose set forth.

2d, The springs, b, attached and operating substantially as shown and described, or the equivalent thereof, in combination with the name blocks or chases, B, all as and for the purpose set forth.

3d, The springs, s, of any suitable material, employed and operating substantially as shown and described, in combination with the strips, G, and plate, A, or the equivalent thereof, all as and for the purpose set forth.

4th, The device, consisting of the tablet, H, strip, I, and cross piece, J, or other equivalent mechanism, constructed and operating substantially as shown and described, in combination with the strips, G, all as and for the purpose set forth.

77,837.—PERPETUAL CALENDAR.—Charles T. Pooler, Deansville, N. Y.

I claim, 1st, A perpetual calendar, consisting of the hands, C and E, working respectively around horizontal and vertical rollers, substantially as herein shown and described.

2d, The perpetual calendar, when provided with the bands, C and E, of which the latter partly covers the former, in combination with the hinged portion, G, of the frame in which the device is held, as set forth.

3d, The band, H, and rollers, I, in combination with the device set forth in the foregoing clauses.

77,838.—SEAT FOR VEHICLE.—Lewis Pray, Portland, Me.

I claim the combination of the jump seat, A, upheld by crossed legs, a a, and pivoted, as shown and described, in combination with the sliding seat D, of a vehicle body, all substantially as and for the purpose set forth.

77,839.—HORSE HAY FORK.—Emanuel Raber, Lake, Ohio.

I claim, in combination with the pivoted forks, A A, the trigger, C, hook, F, and lines or cords, g, connecting said forks with the bar, E, so that the forks may enter and hold and carry the load or charge of hay upon their tines, and drop it at the place of delivery, substantially as herein described and represented.

77,840.—FERTILIZER.—J. S. Ramsburgh, New Market, Md.

I claim the compound for a fertilizer, composed of the ingredients, mixed in the manner and proportions substantially as herein described.

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77,841.—BEDSTEAD, CHAIR, SECRETARY, AND WARDROBE.—William Reckards (assignor to himself and Leonard Gattman), New York city.

I claim, 1st, The box, A, provided with a pendent hinged door, C, and a hinged portion, A x, as shown, in connection with the adjustable box, F, fitted in A, on a rod, G, all being arranged in such a manner that the box, F, may be adjusted in a vertical or a horizontal position, substantially as and for the purpose specified.

2d, The flaps, D D, fitted to the inner sides of the box, A, when used in connection with the hinged portion, A x, of the box, substantially as and for the purpose set forth.

3d, Dividing the box, F, into two compartments by means of a longitudinal partition, b, one compartment containing a mattress, G, and the other furnished to answer as a secretary or wardrobe, or both, substantially as and for the purpose specified.

77,842.—FENCE POST.—I. D. Richards and H. D. Snyder, Carbondale, Pa.

We claim the fence post, with cast iron bottom and wood top, as herein described and for the purposes set forth.

77,843.—HORSE HAY FORK.—George M. Robinson, New Wilmington, Pa.

I claim the combination of the bars, A and B, cutters, D D, slotted center bar, a, trip lever, f, having the notch, n, and cam surface, m, all constructed and operating together, substantially as shown and described and for the purpose set forth.

77,844.—LAMP BURNER.—Wm. J. Ross, Worcester, Mass.

I claim, 1st, The spring, G, secured within the burner, in combination with the pendent hooks, h, on the cone or deflector, for the purpose of securing the latter on the burner, as shown and described.

2d, The upright projections, n x, on the lower part of the cone or deflector, in combination with the hooks, h, and the spring, G, all arranged substantially as and for the purpose set forth.

77,845.—PIANOFORTE ACTION.—Herman Seidel, Roxbury, Mass. Antedated May 2, 1868.

I claim the arrangement of the weight pieces, G, provided with a guide pin b, or its equivalent, with respect to the damper, E, the key, A, the frame, I, and the rest block, F, the whole being substantially as hereinbefore explained.

77,846.—APPARATUS FOR MAKING CIGARS.—J. F. Shepard, Hampton Falls, N. H.

I claim the combination and arrangement of the several parts of the device viz, the hopper, A, the cylindrical tube, B, the plunger, C, the ferrule, D, the spring catch, E, the groove in the plunger, F, and the opening, G, in the bottom of the hopper, substantially in the manner and for the purpose above set forth.

77,847.—MACHINE BELT.—T. F. Snover, Oconto, Wis.

I claim the machine belt, constructed as described, by interposing between two layers of leather, or other flexible material, a series of longitudinal wires connected by transverse textile threads, all secured together as described for the purpose specified.

77,848.—WATCH.—Charles Springer, Newcastle, Pa.

I claim the adjustable collar, D, containing the packing in the annular recess, a, in combination with the back plate, B, cap, C, and post, A, of an ordinary watch, as herein described for the purpose specified.

77,849.—SPRING SEAT FOR SADDLES.—Robert J. Steele, Jr., Rockingham, N. C.

I claim, 1st, The bent springs, D, forming the support for the curved seat, E, each spring being secured at its ends to the horizontal cross bars, C C, at the front and rear end of the frame, A, as herein described for the purpose specified.

2d, Forming the support for the curved seat, E, of single springs, whose front and rear curved ends are secured to horizontal cross bars at the front and rear of the frame, A, as herein described for the purpose specified.

77,850.—AERIAL NAVIGATOR.—Zaphna Stone, Kinsman's, O.

I claim a balloon or aerial navigator, constructed with an upper part, A, having a flat or plane surface and an upper convex surface, and adapted to be filled with gas, in connection with a pendent car, C, having compartments, D D, which are also adapted to be inflated with gas, and a central compartment, E, for the passengers, substantially as herein shown and described.

77,851.—LUBRICATOR.—Hiram Taylor, Cincinnati, O.

I claim, 1st, Supporting the rod, D, by the lower end, c', of the hollow stem out of contact with the journal, substantially as set forth.

2d, The notched or grooved rod, D d, adapted by reversing end for end to change or graduate the freedom of delivery of oil, as herein explained.

77,852.—HAY AND COTTON PRESS.—Gray Utley, Charlotte, N. C.

I claim, 1st, Operating the platen, D, of a cotton or hay press, by means of the blocks, G H, having the dogs, i i, the rods, E E, the link, L, and the levers, J J, all acting in coöperation with each other, in the manner and for the purposes specified.

2d, The dogs, i i each having the arm, a, and operating in combination with the blocks, G H, rod, E, and eccentric collar, m, in the manner and for the purpose set forth.

77,853.—BAIL EAR FOR PAIL.—Jonathan Walton, Brooklyn, N. Y. Antedated April 30, 1868.

I claim the bent wire bail ears, B, constructed as described, the two prongs b b, passing through the side of the pail, A, and clinched upon the inner side and held in position by means of the staple, C, encompassing said ears below the upward projecting loop, a, their inner ends also passing through the side of the pail, A, and clinched upon the inner side thereof, as herein shown and described.

77,854.—CONCRETE BLOCK PRESS.—Lawson S. Warner, Chicago, Ill.

I claim the spring, S, in combination with the toggle bars, H G E and F, and follow bottoms, D, substantsally as shown and described for the purpose of lowering the follow bottoms to their first position, all arranged as set forth.

77,855.—PLOW.—Thomas P. Warren, Norfolk, Va.

I claim, 1st, The slots, a a and a', when arranged in a vertical or inclined position in the mold board, and all extending in the same or parallel lines, in the manner and for the purpose set forth.

2d, The reversible heel iron and guide, G, when constructed so as to be employed in the manner and for the purposes specified.

77,856.—ADJUSTABLE COUCH.—Godfrey Widmer, New York city.

I claim, 1st, A couch consisting of a canvas or other sheet, F, which is fitted over an adjustable frame, B C H, so that it can be stretched in either direction, as set forth.

2d, The eccentric rings, E E, when arranged as described, so that they serve to elevate the sheet, F, to form the head rest of the couch, when said rings are adjustable around a common axis, as set forth.

3d, The strap, I, arranged on the under side of the sheet, F, in front of the head rest, substantially as and for the purpose herein shown and described.

77,857.—DEVICE FOR CLEARING PIPES.—Wm. Young, Easton, Pa.

I claim the arrangement of the tubular reamer, E, with the steampipe D, substantially as set forth.

77,858.—CAR TRUCK.—C. F. Allen, Paw Paw, Mich. Antedated May 9, 1868.

I claim, 1st, So supporting the end of a car upon a six wheeled truck that the weight shall be equally distributed upon all the wheels, by resting it upon a support over but not upon the middle axle, said support being sustained by springs placed on each side of and equidistant from the middle axle, and the whole weight being transferred to the axle through a rigid frame, substantially in the manner set forth.

2d, In combination with the beam, F, the braces, G, and swinging beams, H, placed on each side of the middle axle, and supporting upon their outer ends the side bearing blocks, N, so as to balance the weight of the end of the car over the middle axle, substantially in the manner set forth.

87,859.—FORMING TIGHT SEAMS IN RUBBER CLOTH.—Geo. M. Allerton, New York city.

I claim the stoppers to the rivets and the lapping strips, applied to and combined with the joint or seam of india rubber cloth, as and for the purposes set forth.

77,860.—FERTILIZER.—Jacob Althouse, Cross Roads, Pa., assignor to himself and Joseph V. Winemiller.

I claim the above described composition or fertilizer, compounded in about the proportions specified, for the purpose of manuring land.

Also, the process described of mixing and preparing said composition or fertilizer, substantially as described.

77,861.—WASHING MACHINE.—D. C. Baker, Buffalo, N. Y.

I claim the combination and arrangement of the slatted cylinder, B, one or more rollers, D, the series of aprons, k k k, and spring roller, E, when employed in the manner and for the purpose herein specified.

77,862.—SKATE.—E. H. Barney and John Berry, Springfield, Mass.

We claim, 1st, The heel socket, F, consisting of the portion, p, having the button socket therein, and the threaded neck, r, and operated by means of the screw, G, thus securing the skate to the inner sole of the boot, all constructed and operating substantially as described and for the purposes specified.

2d, A skate having the point or projection, t, formed upon the toe of the runner, substantially as described and for the purpose specified.

3d, A skate having a concave bottom, with the chamfered or beveled sides, n n, substantially as described and for the purposes specified.

4th, The heel fastening to a skate, having the neck, x', the button, h2, the hole, m2, in the heel plate, C, and the hole, m, in the button socket, all of the same shape, the button, b2, and stem having upon its lower end the larger portion, s3, substantially as described.

77,863.—FINISHING LEATHER.—August Bertram, New Albany, Ind.

I claim rendering leather water proof, when the same is accomplished substantially as described.

77,864.—POWER INDICATOR.—N. P. Bowsher, Ligonier, Ind.

I claim, 1st, The peculiar arrangement and combination of the dial, S, pointer, P, shaft, m, coiled spring, N, pulley, K, cord, I, pulley, J, arm, G, and sliding collar, F, of the ball governor, D, E, B, E, D, the several parts being arranged in the manner and for the purpose specified.

2d, The combination of the power indicator with a grain separator, substantially as and for the purpose herein specified.

77,865.—WASTE VALVE FOR PUMP.—Geo. E. Brettell, Rochester, N. Y.

I claim the arrangement in pump pipes of the automatic escape valve, substantially in the manner herein shown and described, and for the purposes set forth.

77,866.—SHEEP SHEARING CHAIR.—Henry D. Brown, Tipton, Iowa. Antedated April 25, 1868.

I claim oscillating racks for sheep shearing chairs, adjusted and fastened by braces, with a holster attached to throw out the side of the sheep and prevent the skin from wrinkling.

2d, Also, the manner of fastening the hind legs of the sheep by means of straps and pins, as shown in the drawings.

77,867.—AUTOMATIC CAR VENTILATOR.—Isaac Buckingham (assignor to himself and H. W. Randall), Seymour, Conn.

I claim the arrangement of the driving blades, D, within the case, F, the said case provided with openings, G and H, so that the said driving blades will revolve in the same direction, into whichever of the said openings the air enters, and having combined therewith and so as to be operated thereby, the spiral blades, C, upon a vertical shaft within a cylinder, B, substantially in the manner and for the purpose described.

77,868.—SHOE FOR AMALGAMATOR.—John H. Bullock, Gold Hill, Nevada.

I claim the combination and arrangement on the face of a shoe or grinder for amalgamators of the grooves, H H, with the supplementary grooves, I I, by which the quicksilver is taken from different points at the outer edge of said shoe, and delivered at different points at the rear of the same, to be in the way of the following shoe, substantially as described.

77,869.—ROTARY STEAM ENGINE.—Wesley B. Campbell, Abingdon, Iowa.

I claim the arrangement of the following parts: The induction pipe, A, the case, B, wheel, C, packing, D, valve, E, spring, F, and eduction pipe, G, substantially as set forth.

77,870.—DEVICE FOR BOILING AND STIRRING FRUIT.—M. G. Collins, Baltimore, Md. Antedated May 8, 1868.

I claim in a fruit-butter stirrer the detachable frame, C, with lids, M, constructed and arranged as described, provided with the flanges, E F, and supporting the posts, G, having the shafts, H, upon one side of the vertical stirrer, K, as herein shown and described.

77,871.—HEATING RAILROAD CARS.—A. C. Crary, Utica, N.Y.

I claim the separate steam generator, M, on the locomotive, heated by the waste heat of the smoke or of the exhaust steam, for the purpose of heating the train of cars, and constructed substantially as herein described.

Also, in combination with a separate steam generator, M, constructed as above specified, the use of pipes, O, H and I, in the manner as herein set forth and described.

Also, in combination with a separate steam generator, M, and pipes, O, H, and I, as above specified, the use of universal or compound joints, in the manner substantially as herein set forth and described.

77,872.—ADJUSTABLE SOFA.—Edward Deetz, Philadelphia, Pa.

I claim, 1st, The rounded and notched rear portion of the end frame, A, of the sofa, in combination with the end frames of the back, hinged to the body and provided with spring bolts adapted to the notches on the said rounded portions of the frames, A, all as set forth for the purpose specified.

2d, The above, in combination with the within described cords and pulleys, by which the spring bolts at the opposite ends of the sofa, may be operated simultaneously as described.

77,873.—CHURN.—Wm. C. Douthett, Rochelle, Ind.

I claim, 1st, The provision in a churn operating mechanism of a weighted arm, F, applied substantially as and for the purpose described.

2d, The combination with the arm, F, of the ball, f1, and jaws, f2 f2, substantially as set forth.

3d, The combination of the bent or twisted blades or wings, J J, with the disk or dasher, B, substantially as and for the purpose set forth.

4th, In a churn, the herein described mechanism, by means of which a complete rotary movement of the churn dasher is produced, while it shall at the same time be caused to rise and fall, as herein set forth and described.

77,874.—ALLOY FOR METALLIC ROOFING.—Levi S. Enos, Almond, assignor to Nathaniel Sweet, Alleghany County, N. Y.

I claim the above described compound, when made substantially in the manner and for the purpose specified.

77,875.—RIGGING FOR JIB SAILS.—Frederick Fillingham, Ithaca, N. Y.

I claim the construction, arrangement and use of the jib sprit or boom, for the purpose of moving and adjusting the jib sail to any point on the starboard or port side of the bowsprit and vessel, as and for the purposes described.

77,876.—DECORATING WALLS.—James C. Finn (assignor to himself, William Howell, and Charles A. Duy), Philadelphia, Pa.

I claim the decorating of walls with a material composed of veneers or ornamental papers, mounted on muslin, stiff paper, or other fabric, when the said material is tacked at the edges only to the walls, and when the joints between the pieces are covered by moldings or headings forming part of the decoration, all substantially as and for the purpose herein set forth.

77,877.—MORTISING MACHINE.—D. L. Gibbs (assignor to R. Ball & Co.), Worcester, Mass.

I claim, 1st, The combination, with the chisel spindle, the pinion or segment gear thereon, and the pawl, a, and ratchet, f, of the bell crank lever and its toothed segment, actuated by stops, m n, in the manner described, and the cam, I, and spring, N, for completing the movement of the spindle, substantially as and for the purposes shown and described.

2d, The combination, with the bell-crank lever and its toothed segment, arranged to operate the chisel spindle, as specified, of the friction spring, H, ledge, o, and stops, p p, substantially in the manner and for the purposes shown and described.

77,878.—GRAIN BINDER.—J. F. Gordon, Kalamazoo, Mich.

I claim, 1st, The binding arm, H, capable of adjustment in the direction of the length of the grain, in combination with an automatic twisting device, substantially as and for the purposes described.

2d, The shafts, G G2, in combination with the binding arm, H, substantially as and for the purposes set forth.

3d, The arrangement of the cam wheel, J, forked lever, I, pitman, f, and lever, n, for giving a vertical vibrating motion to the arm, H, substantially as described.

4th, The hooked twisting wheel, A3, constructed and operated as described and represented, having an intermittent rotating motion, in combination with the stationary knife, P3, as and for the purpose explained.

5th, The clamp plates or jaws, 2 and s, arranged and operating in combination with the arm, H, substantially as and for the purpose set forth.

6th, The slide plate, 14, arranged and operating in combination with the arm, H, substantially as and for the purpose set forth.

7th, The combination of the shaft, 9, spring, g2, chain, h, and sector, X, for giving an intermittent motion to the twisting device, A3, substantially as described.

8th, The combination of the reciprocating rake, T, hinged weighted lever, S, stop pin, i3, and guide, U, all arranged and operating substantially as described.

9th, The employment of the jointed arms, t t2, stop pin, t3, and hook, t4, or equivalent devices, in connection with the connecting rods, S S2 e e2, whereby the rake is held at rest for a specific period, every time it completes its motion toward the binder, substantially as and for the purpose explained.

10th, The tension device, consisting of the arms, H4 h5 h6, and spring, h4, applied and operating substantially as and for the purpose explained.

11th, The combination of crank lever, e, rod, e2, arm, t, or its equivalent, slotted lever, S, and pitman, S2, for the purpose of imparting a reciprocating motion of the rake, substantially as described.

77,879.—STUMP EXTRACTOR.—Jesse Havens (assignor to himself and George Palmer), Auburn, N. Y.

I claim the differential cylindrical shaft, D, tackle block, G, and the rope, C, in combination with the frame, substantially in the manner and for the purposes herein shown and described.

77,880.—CARRIAGE SPRING.—W. B. Higgins, San Francisco, Cal.

I claim the combination of the springs, D D, with the wooden spring, A, to form the connection of the same with the body of the carriage, substantially as described.

77,881.—CHISEL HANDLE.—Robert V. Hilton, John G. Webster and Hiram E. Wheeler, Lowell, Mass.

We claim the handle, C, plug, A, elastic rings, B B, and cap, E, constructed and arranged in the manner and for the purpose as described.

77,882.—ELECTRO-PHONETIC TELEGRAPH.—Royal E. House, Binghamton, N. Y.

I claim, 1st, The use of the reflector, shaped and proportioned in accordance with the principles described, and for the purposes set forth.

2d, The respective arrangement and combination of the reflector and sounding head, as described.

3d, The combination of the reflector with sounding head and limiters, as described, and for purposes set forth.

4th, Hinging the sounder and adjusting its angle, as described, for the purpose of regulating the distance through which the permanent magnetic force shall move.

5th, The use of a set of deflecting magnetized needles, constructed as described, and relatively arranged as described, for purposes set forth.

6th, Constructing the axial aperture of a deflecting needle helix, as described, for the purposes set forth.

7th, The combination of a deflective needle helix, constructed with an axial aperture, as described, with a set of deflective needles, constructed and relatively arranged as described, for the purposes set forth.

77,883.—SLEEPING CAR.—George W. Hunt, Hopkinton, Mass.

I claim the berth leaf or shelf, d, when hung by links, f, in such manner that it may be swung up and locked against the roof, or swung down and locked in position to form the berth, substantially as shown and described.

Also, in combination with such swinging shelf, d, the folding partition piece, h, hinged crosswise at the top of the car, and folding up and locking against the bottom of the shelf, d, or swinging down to form a partition or a support for the front of the shelf, d, substantially as described.

77,884.—CULINARY APPARATUS.—George B. Isham, Burlington, Vt.

I claim, 1st, The combination of the several parts of a culinary apparatus, or steamer, baker, broiler, and fryer combined, all as herein described, and for the purpose set forth.

2d, The particular construction of the outside, A, with its detachable bottoms, F and D, all as herein described and for the purpose as set forth.

77,885.—BUCKLE.—Joseph H. James (assignor to himself and Seth Baxter), Warren, R. I.

I claim a buckle composed of two frames, one sliding upon the other, and arranged with a thumb rest, or its equivalent, substantially as described.

77,886.—SHIELD FOR SMOOTHING IRON.—William J. Keep, Buffalo, N. Y.

I claim a shield plate, A, for smoothing irons, provided with the oblong opening or openings, a, for admitting the handle of the iron, and with a shank, B, for connecting a holder with the shield, constructed and operating substantially as herein specified.

77,887.—POSTAGE AND REVENUE STAMPS.—Miner Kilbourne Kellogg, Baltimore, Md.

I claim so printing a revenue or postage stamp or check requiring cancellation, with a non-fugitive color, and also with a fugitive ink or color, composed of the ingredients herein described, that the fugitive color shall lie in the blank places left after printing with the non fugitive color, substantially as deseribed.

77,888.—SCREW PROPELLER.—John E. Kennedy, New Orleans, La.

I claim constructing the blades or wings of a screw propeller with two reversed curves, when the outer curves shall be drawn upon a radius equal to one fourth only of the radius of an arc of the circumference of the screw, and the inner curves upon a radius three times the length of the radius of the said outer curves, substantially as herein described for the purpose set forth.

77,889.—SEWING MACHINE.—Oscar C. Kerr, Philadelphia, Pa. Antedated May 4, 1868.

I claim, 1st, A loop carrier, U, constructed substantially as described, and operating in conjunction with an eye-pointed needle and a loop holder, W, to produce, from the neeele thread, the stitch, fig. 15, in the manner set forth.

2d, A needle, a, and loop holder, W, in combination with an adjustable loop holder, U, the whole being constructed and operating substantially as and for the purpose specified.

77,890.—CURTAIN FIXTURE.—Ira Kinman, Freeport, assignor to Sarah Kinman, Stephenson county, Ill.

I claim the reversible crank handle, h, and angular catch, g, in combination with the roller, B, and arranged to operate as set forth.

77,891.—PREVENTING HOGS FROM ROOTING.—John D. Kirkpatrick, Urbana, Ohio.

I claim the within-described instrument, consisting of the handles, A A' B B', and the plates or parts, D E, having the openings, d f, and the cutter, g, provided with inclined side pieces, h h, substantially as and for the purpose set forth.

77,892.—BEEHIVE.—E. I. Kline, Kirkville, Iowa.

I claim a beehive, combining in its construction the following elements, viz.: first, a base, A, constructed with a diaphragm, A', spout, B, and openings, C; second, a section, D, with slats at E; third, the double glass plates, F; fourth, the section, G; fifth, the glass plate, H; and, sixth, a cap, I; said base, sections, and cap being composed of glazed earthenware, and the parts being arranged substantially as described.

77,893.—FISHING APPARATUS.—Joseph Koehler, N. Y. city.

I claim, 1st, The trigger lever, d, applied substantially as specified, in combination with the spring jerk, the parts receiving the fishing line, as set forth.

2d, The swinging arm, h, in combination with the trigger lever and holding eye, i1, or its equivalent, so that the parts may be folded as set forth.

3d, The steel yard, n, in combination with the trigger lever, d, and jerk spring, c, substantially as and for the purposes set forth.

4th, The spring hook q, formed of the arms, 14, extending from the coil, 15, and terminating in the reverse hooks, 16, so that the hooks can be opened by pressing the arms, 14, toward each other, as set forth.

77,894.—BRICK MACHINE.—Wm. O. Leslie, Philadelphia, Pa.

I claim, 1st, The combination of the pug mill or mixing tub, G, with the chamber, g', having the plunger, I, working therein, the chamber, g, with the plunger, J, and the reciprocating mold carriage, W, all constructed and arranged to operate substantially as shown and described.

2d, The mold carriage provided with the racks, T, in combination with the segment wheels, S and S', and the spur wheels, Q and Q', when arranged as shown and described, for the purpose of imparting to the mold carriage a reciprocating motion, as set forth.

77,895.—MACHINE FOR DRESSING STONE.—William O. Leslie, Philadelphia, Pa.

I claim the combination of the wheel, A, having the cutters attached, with the table, B, provided with the rack, a, and the shaft, m, provided with the pinion, u, and having its outer end journalled in the lever, L, all arranged to operate substantially as described.

77,896.—CYLINDRICAL PLATE PRINTING MACHINERY.—G. F. Lewis, Philadelphia, Pa., and F. D. Stuart, Washington City, D. C.

We claim, 1st, Applying whiting or other material, as a detergent, to the cylinder, in a solid form, by means of boards, i1 i2, and springs, i, or equivalents, substantially as described.

2d, The buff, f3, applied to the detergent roller, F, substantially as and for the purpose described.

3d, The application of gas to heat the printing cylinder and the ink rollers, by means of pipes, b, passing through said rollers, and provided with burners or jets, b1 b1, substantially as described.

77,897.—HARVESTER.—E. J. Leyburn, Lexington, Va.

I claim, 1st, The shifting device, f, constituting an auxiliary to the cam, J, substantially in the manner described, and applied to a combined rake and reel of the character substantially as described, whereby the raking can be stopped and started at pleasure while the reels and rake continue to revolve, substantially as set forth.

2d, The combination of the vertically and bodily adjustable frame, A3, with the rock shaft, S, and the inner and outer supporting wheels, D and d3, substantially in the manner and for the purposes described.

3d, The segmental toothed frame, E, provided with a latch and lever, and pivoted to the draft frame, A3, said frame having the axle of the supporting wheel, D, applied to it, and being attached, by means of a lever, B1, to a pivoted draft pole, B, so that in the act of raising and depressing the draft frame the front end of said pole shall remain in one given position, substantially as described.

4th, The idler or pulley, E1, applied to the vibrating frame, E, so as to maintain proper tension of the belt, C1, at all times, substantially as described.

5th, The toothed segment frame, E, adapted for suspending the frame, A3, and for being geared with toothed pinions, a a, and for being connected to the devices which actuate the wheel d3, substantially as and for the purposes described.

6th, The continuously vertically revolving reel arms, I1, intermittent horizontally sweeping rake, I2, and a shifting device, t, in combination with a hand lever, G1, and catching device, y y', substantially as described.

77,898.—STUMP EXTRACTOR.—John Longanecker, New Pittsburg, Ohio.

I claim the combination of the tongue, C, gears, b' and d, windlass D, rope d2, pulleys, E and F, and lever, G, with the frame, A, and braces, a, when arranged and operating as and for the purpose set forth.

77,899.—METAL CANS AND CASES FOR PUTTING UP ALKALIES. John McCoy (assignor to himself and W. T. Snell), Philadelphia, Pa.

I claim the within described can or case, composed of the body, A, bottom a, inner annular cover, b, and outer cover, d, all being arranged and secured by lap joints, as set forth, for the purpose specified.

77,900.—OIL CUP FOR STEAM PRESSURE.—Franklin P. McCullon and Wm. Woodcock, Philadelphia, Pa.

We claim, 1st, The needle or plug, B, and the index or finger, E, in combination with an oil cup, A, substantially as shown.

2d, The key, F', finger, i, sieve, K, in combination with an oil cup, A, substantially as shown.

77,901.—SKATE.—Achille F. Migeon, Wolcottville, assignor to Union Hardware Company, Torrington, Conn.

I claim 1st, The metallic brackets, g g, each formed with an elongated hole receiving the tongue at the end of the runner arm, into which said tongue is riveted, so that said brackets stand as T-pieces across the arms of the runner, and are united to the sole plate by the screws or rivets, o, as set forth.

2d, The clamps, k l, in combination with the screw, m, that passes through the flange of the clamp, l, and through a threaded hole in the runner, fitting said screw, m, so as to confine the boot sole by the clamps, k l, in the manner specified.

77,902.—MANUFACTURE OF PACKING FOR STEAM ENGINES, ETC.—Wm. H. Miller, Philadelphia, Pa.

I claim the process above described, or its substantial equivalent, whereby the combination of dry powdered and dry fibrous material may be secured from the effects of water or condensed steam.

77,903.—CAR BRAKE AND STARTER.—C. D. Moody, St. Louis, Mo., assignor to himself and Horace Billings, Beardstown, Ill. Antedated April 28, 1868.

I claim the combination and arrangement of the wheels, B B' and D, with the axle, A, and the spring, C, as described and set forth.

77,904.—COMPOSITION FOR REFINING AND TOUGHENING IRON. John H. Nolf (assignor to himself and John D. Williams), Philadelphia, Pa.

I claim the treatment of iron during the process of puddling with a composition consisting of the within described ingredients or their equivalents, in the manner and for the purpose described.

77,905.—CUTTING AND FORMING BLIND "HOOK BLANKS."—Galen Orr, Needham, Mass.

I claim making blind hook blanks by cutting plate metal to the shape herein specified.

77,906.—HAND FORK.—Fred'k. W. Palmer, West Richmondville, N. Y.

I claim a hand fork substantially as described, for the purposes set forth.

77,907.—HORSE HAY FORK.—Nelson Palmer, Albany, N. Y.

I claim the spring catch, k, in combination with the bail, E, and roller, i, for the purpose of holding the bail, e, in position, or releasing it, at pleasure.

77,908.—MACHING FOR WIRING BLIND SLATS.—George Pancake, Harrisburg, Pa.

I claim, 1st, Feeding the staples to the driver, W, by means of the wheel, b, said wheel being constructed and operating substantially as described.

2d, The staple supplying incline, a, in combination with the feeding wheel, and driver, W, arranged to operate in the manner and by the means substantially as set forth.

77,909.—REVERSIBLE KNOB LATCH.—John E. Parker, Meriden, Conn.

I claim, 1st, The yoke, B, provided with a projection, a, and arranged so as to be raised from the latch bolt, substantially as shown.

2d, In combination with the above the fixed guides, d d, for guiding and holding the latch bolt in position, substantially as described.

3d, The arm, G, constructed so as to form a seat for the spring on the spindle, C, and also as a means for operating the yoke, B, to permit the removal of the latch bolt, substantially as herein set forth.

77,910.—MACHINE FOR THREADING SCREWS.—Wilbur F. Parker, Meriden, Conn.

I claim the combination of the mandrel, or its equivalent, for rotating the screw blank and the guide, R, with a chasing tool and mechanism for imparting to the said tool a movement of translation along the body of the screw blank, and curvilinearly along the curved or tapered extremity of the blank, substantially as described.

77,911.—HAIR DYE AND DRESSING COMPOUND.—George F. Peckham, M. D., Grafton, Ohio.

I claim a compound composed of the ingredients, and in nearly the proportions substantially as herein described.

77,912.—MACHINE FOR STICKING PINS.—Truman Piper and E. F. Bradley (assignors to Howe Manufacturing Company), Birmingham, Conn.

We claim, 1st, In combination with the several independent channels, the cut-off device for each of the said channels, constructed and arranged substantially as described, and operating so as at the proper time to deliver the pins from either or several of the channels, substantially in the manner herein set forth,

2d, The combination of the intermittently revolving ratchet, cam wheel, spring levers, and cut-off slides, with the slide, B, substantially as herein described.

77,913.—GLOBE VALVE.—James Powell, Cincinnati, Ohio.

I claim, 1st, The loose collar or guiding rim, F, applied to the neck of a globe valve, substantially in the manner described.

2d, The packing collar, G, in combination with the loose disk valve and grooved hub, C, as described and set forth.

77,914.—DETACHABLE NOSE FOR BOWLS, ETC.—George Raymond, Fitchburg, assignor to himself and Oliver P. Conklin, Worcester, Mass.

I claim the combination with a detachable nose for bowls and other articles, provided with one or more loops, b, as herein described, of an elastic band, for holding the said nose to the bowl to which it is applied, substantially in the manner and for the purposes herein shown and specified.

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77,915.—JOINT FOR SHACKLES.—John F. Reiner, Columbus City, Iowa.

I claim a joint or shackle having parts, A and B, bolts, C and E, clutch, D, and hollows, G, constructed, combined, and arranged substantially as specified.

77,916.—CAN OPENER.—Charles F. Ritchel, Chicago, Ill.

I claim the can opener made of one piece of sheet metal, as described, provided with point, D, and blade, E, both arranged and operating substantially as herein shown and specified.

77,917.—GAS BURNER.—Wm. H Rodgers, Brooklyn, N. Y.

I claim, 1st, the cock, c, formed with the gas ways 2, 4, and 7, in combination with the opening, 3, and pipes, 5 and 6, to supply gas to the chamber, f, and jet, i, when the jet, e, is extinguished, the parts being arranged and acting substantially as and for the purposes set forth.

2d, The regulating screw or cock, 8, in combination with the jets, i and e, as and for the purposes set forth.

77,918.—HARNESS LOOP.—Geo. W. Rowland, Salem, Oregon.

I claim a winged metallic loop for attachment to harnesses, constructed to operate substantially as described.

77,919.—MOP WRINGER.—Hugh B. Rorke, California, Mo. Antedated April 29, 1868.

I claim the rollers, B B', either with or without corrugations, the ear pieces, A, lever, C, when combined and arranged as described and set forth.

77,920.—MACHINE FOR TREATING HIDES.—Hermann Royer Louis Royer, San Francisco, Cal.

We claim, 1st. The vertical shaft, B, with a slot, B', and set screws, b b b, said shaft having a forward and and back motion, substantially as and for the purpose described.

2d, The pins or rollers, C C, set in the rings, D and D', together with the grooved weight, I, substantially as and for the purposes described.

77,921.—SOLDERING FURNACE.—Geo. O. Sanderson, Boston, assignor to himself and E. D. Goodrich, Cambridge, Mass.

I claim, 1st, The flattened tube, A D E, when made and arranged substantially as described and for the purpose set forth.

2d, The combination as well as the arrangement of a Bunsen burner with a deflector, G, to the pieces, K K' K" K"', and the case N O, made substantially as described and for the purpose set forth.

77,922.—APPARATUS FOR HANDLING IRON IN ROLLING MILLS. Elias Sanford, Meriden, Conn.

I claim the pan, C, with the valve, a, attached, and its peculiar construction, with the perpendicular bar, D, and double jointed lever, F, by which it is carried around and over the upper roll, and presented to the man in front of the machine, substantially as herein specified.

77,923.—REGULATING AND DISPENSING MECHANISM.—Socrates Schofield, Providence, R. I. Antedated March 20, 1860.

I claim, 1st, Causing the motion derived from any kind of governor, as transmitted in one direction, to be stopped and controlled by an obstructing point or notch, or system of elevations and depressions, operating under the action of a governor, transmitted in annother direction, substantially as described.

2d, Arranging the ratchet teeth in steps, or one above the other, in connection with a guard operating to produce a corresponding change in the elevation of the catches, substantially as and for the purpose specified, in any regulating or dispensing mechanism.

3d, The combination of several elements, consisting, first, of a dispensing device; second, of a vibrating bar or lever; and third, of an opposing point, placed in connection or combination with any governor or other indicator of a desired change in the action of a machine, to operate substantially as described.

77,924.—GRAIN DRILL.—Jacob H Shreiner, Camp Hill, Pa.

I claim, 1st, The peculiar construction of the foot, B, substantially as and for the purpose herein set forth and described.

2d, The combination of the foot, B, cutter, C, and boot, A, substantially as herein shown.

3d, The cutter guard, E, substantially as and for the purpose set forth.

4th, The combination and arrangement of the feed pipe or boot, A, cutter guard, E, brace, D, cutter, C, foot, B, and share, d, substantially as herein set forth and for the purpose specified.

77,925.—MACHINE FOR MAKING DRAIN PIPE.—Robert Skinner, San Francisco, Cal.

I claim, 1st, The follower, G, constructed with slots, G' G', and the curved openings, F F, in which it slides, in combination with the stationary core, E, and ring, N, substantially as and for the purpose set forth.

2d, In combination with the above claimed apparatus, the steam jacket, J, for heating the same, and the material worked thereby, substantially as described.

77,926.—CHURN.—J. C. Slaughter, Crumpton, Md.

I claim, 1st, A casing, A, contracted in diameter near the bottom, in combination with a series of revolving blades, arranged nearer together at the lower than at the upper end of the casing, for the purpose set forth.

2d, The frame, G, having blades, m, extending across the same, and hung to the shaft, C, in respect to its blades, n, as and for the purpose specified.

77,927.—FOXING AND SOLING BOOTS.—Alfred G. Smith, Marathon, N. Y.

I claim, as an improved article of manufacture, a foxing or fronting and soling for boots and shoes, constructed separately from the work to which it is to be applied, substantially as and for the purpose set forth.

77,928.—MEASURING-FAUCET.—James D. Smith (assignor to Arthur P. Emery), New York city.

I claim, 1st, The combination, with a rotary measuring and drawing device, C, arranged in the chamber, B, of the faucet, A, and turned from the outside by crank or handle, G, of the fast and loose differential wheels, I J, pinion, K, carried by the handle and wheels, M N, or their equivalents, for operating the dial, P, substantially as shown and described.

2d, The dial, P, hung for independent action, as described, and for free rotation with the wheel, N, by which it is driven by frictional gear with the latter, through a spring or springs interposed between said wheel and dial, essentially as specified.

77,929.—DOUBLE STEAMER FOR TIN WORK.—Charles F. Spaulding, St. Johnsbury, Vt., assignor to himself and E. D. Goodrich, Cambridge, Mass.

I claim, 1st, The carrying disk, F, the shaft, D, and crank, E, when combined with the compressing-disk, H, operating substantially as described, and for the purpose set forth.

2d, The rubber band, G, in combination with the disk, F, substantially as described, and for the purpose set forth.

3d, The standard, K, pivot, K', in combination with the brace, N, substantially as and for the purpose set forth.

4th, The combination and arrangement of the lever, M, shaft, I, sliding standard, J, and standard, K, substantially as described, and for the purpose set forth.

77,930.—DITCHING MACHINE.—George H. Stevenson, Washington, Ohio.

I claim the construction of a spade that will cut a ditch ready for tile, thirty inches deep, without the use of any other instrument, and is useful for digging post holes and many other useful things, which is done by the movable foot-piece and peculiar shape of the blade and lips attached thereto.

77,931.—BOOT AND SHOE LAST.—James H. Swain, San Francisco, Cal.

I claim the projection or flange, C, or its equivalent, on the face of the last, substantially as and for the purpose specified.

77,932.—PUDDLING AND BOILING FURNACE.—William Swindell, Allegheny City, Pa.

I claim, 1st, A bottom plate for a puddling or boiling furnace, cast with a series of grooves in or along its lower surface, in which to arrange a series of water pipes, substantially as and for the purposes hereinbefore set forth.

2d, The use of a series of tubular water chills, a', when arranged in grooves cast in the lower face of the bottom plate of a boiling or puddling furnace, substantially as and for the purposes hereinbefore described.

3d, Supporting the boshes of a puddling or boiling furnace by a ledge or rim, c, on the upper face of the bottom plate, and extending around in it the outside line of the boshes, substantially as and for the purposes hereinbefore expressed.

4th, Jointing the boshes of a puddling or boiling furnace to the bottom plate and to each other by ribs, e, so shaped as, in connection with lips, c', to form a dove-tail joint, substantially as and for the purposes set forth.

5th, Making chill-faced boshes for puddling or boiling furnaces, by casting them against a metalic chill, substantially as and for the purposes hereinbefore set forth.

77,933.—OSCILLATING RUBBING MACHINE FOR MEDICAL USES.—George H. Taylor, New York city.

I claim, 1st, The rubber, A, composed of India rubber, and having its outer surface coated or covered with India rubber, the said outer surface being furnished with projecting ribs, points, or corrugations, and the said rubber A being constructed substantially as and for the purpose specified.

2d, The combination, with the rubber, A, of the forked rod, C, hung on a pivot, E, and operated by any suitable mechanism, substantially as and for the purpose set forth.

3d, The combination, with the rubber, A, and rod, C, of the crank, G, arm or connecting-rod, H, and shaft, I, substantially as described and for the purpose set forth.

4th, The combination, with the rubber, A, driven by suitable mechanism, substantially as set forth, of the couch, S, properly connected with the frame, O, and having an opening, R, through it, for the said rubber A to work through, substantially as and for the purpose set forth.

77,934.—TAILORS' PRESSING MACHINE.—Joseph W. Thorpe, Hillsborough Bridge, N. H., assignor to himself and David F. Brown.

I claim, 1st, The arrangement of the socket, E, the sleeve, F, and the spindle, J, with the press iron and its adjusting handle, substantially as set forth.

2d, Supporting the heater at a distance from the face plate of the press iron, by means substantially as described and for the purpose specified.

3d, The arrangement of the adjustable handle, a, and cam, a', with the spindle, J, and press iron, for the purpose suostantially as set forth.

4th, The rubber or elastic bearing, e, arranged in combination with the jack P, substantially as set forth.

77,935.—APPARATUS FOR COOLING AND PURIFYING BONE BLACK.—Daniel H. Turner, New York city.

I claim, 1st, The combination of the circumferentially close revolving cylinder, A, provided with interior lifters, and set horizontal, or thereabouts, screen, or screen extension, C, at the forward end of said cylinder, and hot air, gas, and dust conductor, F, for operation together substantially as specified.

2d, In combination with the circumferentially close cylinder, A, and screen forward extension, C, the adjustable ring or cover, K, essentially as shown and described.

3d, The arrangement, within the conductor, F, of the distributing apron, H, for operation in connection with the cylinder, A, provided with lifters, and set horizontal, or the reabouts, as herein set forth.

77,936.—LAMP SHADE.—Gustav Wedekind, Philadelphia, Pa.

I claim, in combination with the radial braces for supporting the shade on the chimney, the raised elbows on said braces, to support the shade and prevent it from shaking about, substantially as and for the purpose described.

77,937.—BED PAN ATTACHMENT FOR INVALID BEDS.—Sam'l G. Welling, New Rochelle, N. Y.

I claim the movable elastic seat piece, in combination with the pipe and pan, substantially as and for the purposes set forth.

77,938.—ARTIFICIAL IVORY.—William M. Welling, New York city. Antedated May 2, 1868.

I claim the composition herein specified, prepared as set forth.

77,939.—CHURN DASHER.—E. B. West, St. Anthony, Minn.

I claim, 1st, The arrangement of the arm, N, and stationary paddle, O, as specified, and for the purpose set forth.

2d, The combination of the stationary arm, N, and its paddle, O, with the movable arms, M I, their paddles, and the plate, A, all constructed and operated as specified.

77,940.—PORTABLE MUSIC STAND.—Daniel M. White, Malden, Mass.

I claim so arranging a convertible cane and music stand that when closed to form a cane, said cane shall consist of the hinged legs, B B B, and the tube, A, said parts being adapted to enclose the rod, D, and folding rack, C, and, when arranged as a music stand, the legs, B B B, shall be extended to support the tube, A, and the rod, D, and frame C be adjustably supported on the latter by means of the spring, S, substantially as described.

77,941.—TUBE WELL.—William H. White, Lynn, Mass.

I claim the combination, with a well tube, A, of the movable strainers of induction tubes, applied and operating substantially as described.

77,942.—PORTABLE FENCE.—Thos. B. Wickham, Granville, Ohio.

I claim the manner of locking and supporting the panels by the double brace and clamp, B B, in combination with the stakes, D D, and lock, C C, all substantially arranged as set forth in the foregoing specifications.

77,943.—PLATFORM CAR STAKE HOLDER.—Wm. J. Willits, Detroit, Mich. Antedated April 28, 1868.

I claim, 1st, The arm, I, cams, N N, collar, H, staple bolts, F F, etc., clamp, E, plate, R, projection, O, staple bolt, P, nut, S, and lever, L, for the purpose designed.

2d, The combination and arrangement of the stake, B, the sill, A, the gain, D, in the floor, C, the clamp, E, the staple bolts, F F, etc., the collar, H, the arm, I, the head, K, the lever, L, the cams, N N, the projection, O, staple bolt, P, the plate, R, the ring, X, and the stop, T, arranged substantially as described for the purpose designed.

77,944.—VEGETABLE WASHER.—George H. Tift, Morrisville, Vt.

I claim the combination of the bolt headed journals, C C, when attached to the rotating cylinder, F, from its interior, and used with the pivoted blocks, J J, in the manner as specified.

REISSUES.

2,925.—COVERING WHIPS.—Chas. C. Pratt, Westfie.d, Mass., assignee by mesne assignments of Gamaliel King. Patented June 18, 1867. Division 1.

I claim, 1st, A water proof coating, consisting of the combined ingredients herein shown and described.

2d, The application of the dissolved caoutchouc with or without the lead and oil, to a whip, substantially as and for the purpose shown.

2,926.—COVERING WHIPS.—Chas. C. Pratt, Westfield, Mass., assignee by mesne assignments of Gamaliel King. Patented June 18, 1867. Division 2.

I claim, 1st, The covering of the body of a whip with an inner braiding, d, substantially as shown and described.

2d, The combination of the inner and outer braidings, d f, with the varnish or coatings, c e, all applied in the construction of a whip, substantially as shown and described.

2,927.—MACHINE FOR POLISHING BUCKLES.—Emanuel Andrews, Williamsport, Pa., assignee of Robert G. Pine. Patented April 8, 1856.

I claim, 1st, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for said holder, and springs to bear the article against the revolving wheel with a yielding pressure, substantially as before set forth.

2d, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, springs to exert a yielding pressure, and guides to limit the movement of the article under the yielding pressure, substantially as before set forth.

3d, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, springs to exert a yielding pressure, and traversing mechanism, to move the article transversely to the rim of the wheel, substantially as before set forth.

4th, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, guide to limit the movement of the article towards the polishing wheel, and pattern for the article, substantially as before set forth.

5th, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, guide to limit the movement of the article towards the polishing wheel, and pattern for the article, substantially as before set forth.

6th, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, spring, guide, and pattern, substantially as before set forth.

7th, The combination of the following instrumentalities, viz., the revolving polishing wheel, holder for the article, shaft for the holder, springs to exert a yielding pressure, traversing mechanism, and guide to limit the movement of the article towards the polishing wheel, substantially as before set forth.

2,928.—OPERATING THE TREADLES OF LOOMS.—Robert W. Andrews, Stafford, Conn. Patented January 18, 1853. Extended seven years.

I claim the combination, in a loom, of the harness frame and cords with the treadles and treadle cams, constructed and operating substantially as described.

Also, the treadles and the movers or cams, combined, constructed, and arranged so that by reversal of the cams upon the shaft, a reversal of the movements and retentions of the harness frames is produced, substantially as herein set forth.

Also, in a cam loom having upright treadles or harness levers strung to the harness leaves or frames, and actuated by a single set of cam wheels, the arrangement of the fulcrum shaft of the harness levers directly over or within the vertical plane of the cam wheels, substantially as described.

2,929.—CORSET SPRING.—Francis L. Barnes, New York city, administratrix of the estate of Samuel H. Barnes, deceased. Patented July 17, 1866.

I claim a corset spring, consisting of the parts, B, provided with pins, b, and slotted springs, B2, riveted as shown, and having suitable clasps, C, and headed rivets, D, and of form corresponding to the body of the wearer, constructed and operating in the manner and for the purpose herein represented and described.

2,930.—PAPER FILE.—Henry E. Woodbury, Washington, D. C. Patented August 8, 1854.

I claim the box or compartment document file, consisting of a box part, A, and spring platen or holder, B, the said holder being hung or attached to a spring or springs, C, at its back, so as to give a flexible or yielding character to the platen, all constructed and operating substantially as herein described.

2,931.—HARVESTER.—Jacob V. A. Wemple, Quincy, Mich. Patented April 19, 1859.

I claim, 1st, A separating rod or finger, W, automatically interposed, for separating the falling grain from that which is being discharged from the platform.

2d, The rod or finger, W, pivotal piece, C, and standard, E, in combination with the rod, B, constructed and operating substantially as specified.

3d, A movable or separating rod and finger, for separating the falling grain from the completed gavel on the platform, in combination with a single supporting standard or post, located at the inner end, or inner front corner of said platform, substantially as described.

DESIGNS.

3,019.—IMITATION BRAID FOR BONNETS, ETC.—Samuel A. Blake, Milford, Conn.

3,020 to 3,032.—BRACKETS.—F. W. Brocksieper (assignor to Sargent & Co.), New Haven Conn.

3,033.—CARD RECEIVER.—F. W. Brocksieper (assignor to Sargent & Co.), New Haven, Conn.

3,034.—MATCH SAFE.—F. W. Brocksieper (assignor to Sargent & Co.), New Haven, Conn.

3,035.—MEDALLION.—Garret Erkson, Brooklyn, N. Y.

3,036 to 3,039.—FLOOR OIL CLOTH PATTERNS.—Charles T. Meyer, Bergen, N. J., assignor to Edward C. Sampson.

3,040 and 3,041.—FIGURE.—Carl Muller and John Deacon, New York city.

3,042.—CLOCK CASE.—George B. Owen, Winsted, Conn.

3,043.—BOX STOVE.—Asa Snyder and Alexander Delaney, Richmond, Va.

3,044.—TRADE MARK.—James S. Waters, St. Louis, Mo., assignor to St. Louis Lead and Oil Company.

3,045.—STEAM-VALVE CASE.—John Johnson, New York city.

3,046.—DOOR OF A COOK'S STOVE.—John Martino, Jacob Beesley, and John Currie, Philadelphia, assignors to March, Sisler and Company, Limerick Station, Pa.

3,047.—COFFIN HANDLE.—C. L. L. Nieberg (assignor to Sargent and Company), New Haven, Conn.

3,048.—TRADE MARK.—Dudley F. Stevens, Boston, Mass.

EXTENSIONS.

ATTACHING PROPELLERS TO THE DRIVING SHAFT.—James L. Cathcart, Georgetown, D. C. Letters Patent No. 10,790. Dated April 18, 1868.

I claim attaching the propeller, secured to a short shaft which passes through the rudder to its main or driving shaft, by a universal joint placed between the stern post and the rudder, by which attachment the propeller is moved laterally with the movement of the rudder.

APPARATUS FOR MOLDING CANDLES.—Willis Humiston, Troy, N. Y. Letters Patent No. 10,730. Dated April 4, 1854. Reissue No. 2,190. Dated March 6, 1866.

I claim, 1st, The employment of the wick stretcher, E, so arranged and combined with the machine, having vertical stationary candle molds therein that the candle wick within such molds shall be uniformly stretched or strained before the material is run or poured into such molds, and the friction or strain be removed therefrom before the candles are drawn or ejected from such molds in a vertical direction, substantially as herein described and set forth.

2d, I claim the stretching or straining of the candle wick in each and every of the vertical stationary candle molds contained in the candle mold machine, at and by one continued or simultaneous operation, when the said wick extends from spools or bobbins below said molds upwards into and through the center thereof, and from the lower or tip end of such molds to and into the candles suspended above such mold, substantially as herein described and set forth.

3d, I claim the employment of the candle tip bar, F, or any substantial equivalent therefor, which shall be so constructed and arranged as to be moved in a lateral direction up to, or against, or under the tips of the candles drawn or ejected from the stationary candle molds below, and thereby come in contact with the tips of the said candles in such manner as to center the candle wick in the said molds, and at the same time hold the said candles thus suspended during the operation of filling the said molds with melted material from which to mold candles, and during the cooling thereof, and until the wick is cut or severed between the said suspended and molded candles in said stationary candle molds, substantially as herein described and set forth.

4th, I claim a vertical stationary candle mold, constructed with an inner and annular shoulder, h', and with an outer surrounding shoulder, c, and with a screw and nut at or near the lower end thereof, in the manner and for the purposes substantially as herein described and set forth.

5th, I claim the contraction of the lower end of the vertical stationary candle molds, so as to form an inner annular shoulder, in the manner and for the purposes substantially as herein described and set forth.

6th, I claim the mode, substantially as herein described and set forth, for attaching to, and combined with the lower end of the vertical stationary candle molds, having an outer surrounding shoulder, c, and the bottom plate, B', of the surrounding water box, so as to make the same water tight and firm therein, in the manner and for the purposes substantially as herein described and set forth.

7th, I claim the employment of the shovel blade cutter, J, or any equivalent therefor, and the passing of the same between two rows of the wicks of the vertically suspended candles, so as to cut or sever the two rows of the said wicks, in the manner and for the purposes substantially as herein described and set forth.

RAILROAD CARS.—B. J. La Moth, New York city. Letters Patent No. 10,721. Dated April 4, 1854. Reissue No. 360. Dated March 18, 1856.

I claim the construction of the frames of railroad cars, substantially in the manner and for the purposes specified.

SEWING MACHINE.—Samuel J. Parker, Ithica, N. Y. Letters Patent No. 10,757. Dated April 11, 1854.

I claim that combination that secures to me the relative position in which I place the needle's eye to the movement of the material or feed motion, and and the position of the shuttle and its race resulting therefrom, when the needle is straight and the table on which the material to be sewn is horizontal, said relative position meaning the longitudinal axis of the shuttle and its race at right angles to the feed motion, and the consequent position of the needle's eye therefrom, so that the line drawn through the needle's eye, when in the act of passing the center of the material sewed, shall coincide with the line of feed motion, not be at right angles therewith, and this for the purpose of rendering the stitch more nearly straight and perfect than it otherwise would be, the combination and purpose substantially as described.

HEATING SKELPS FOR THE MANUFACTURE OF WROUGHT IRON TUBES.—James McCarty, Reading, Pa. Letters Patent No. 10,747. Dated April 3, 1854.

I claim the new mode of operating, as described, viz., heating the skelps in a furnace constructed substantially as herein set forth, with raw coals as fuel, whose combustion is maintained by a blast of air forced into the furnace under pressure, as set forth.

VESSELS FOR HOLDING LIQUIDS.—Julia M. Colburn, Baltimore, Md., administratrix of James Stimpson, deceased. Letters Patent No. 11,819. Dated Oct. 17, 1854. Antedated April 17, 1854.

I claim the employment of a chain or string attached to the handle and lid of a pitcher, as described.

TREATING CANE FIBER FOR PAPER AND OTHER PURPOSES. Benj. A. Lavender, Halifax, N. C., and Kate Lowe, Baltimore, Md., administratrix of Henry Lowe, deceased. Letters Patent No. 10,722. Dated April 4, 1854

We claim breaking down woody fiber of cane and other like plants, and dissolving the gummy and other foreign matters therefrom by means of muriatic or sulphuric acid, of the strength of 10° Baumé, or thereabout, preparatory to making hemp for bagging, rope, paper pulp, etc., in the manner substantially as set forth.

MACHINERY FOR LAYING ROPE.—Stephen Bazin and James A. Bazin, Canton, Mass. Letters Patent No. 10,823. Dated April 25, 1854.

We claim adapting the machinery for forming both hard and soft cordage by means of the ring, g, so actuated by the circular plate, i, and its rollers made to revolve, or hold stationary, as above set forth, as to form an extra twist in the rope when desirable, by giving an additional revolution to the bobbin frames, as above described.

We also claim an improvement in the movable crane, the same consisting in forming it of a bent shape, with the right angular hinged arm operating as above described, so as to feed the rope in a direction parallel with the axis of the winding reel.

We also claim stretching the rope after it is laid, by means of the double pulley, r b, with grooves of different diameters, as above set forth.

COFFEE POT.—James Buell, New York city, executor of Jas. MacGregor, Jr., deceased. Letters Patent No. 10,752. Dated April 11, 1854.

I claim having the pot where the tea or coffee is prepared air tight, and so regulating the heat that is applied to the heating of the same that a small pressure by the covers prevents it from boiling, and consequently from evaporation, while the tea or coffee is being prepared, in the manner and for the purpose substantially as above set forth.

AIR ENGINES.—Philander Shaw, Boston, Mass. Letters Patent No. 10,868. Dated May 2, 1854. Reissue No. 1,014. Dated July 17, 1860. Again reissued No. 71. Dated April 23, 1861.

I claim, 1st, The within-described auxiliary heater, constructed and arranged as set forth, the exhaust air and the products of combustion being passed through in one direction while the cold air from the force pump is passed through in the other, by which means the heat is extracted from the heated air and smoke and transferred to the cold air on its way to the engine the latter being pumped in against a pressure much less than that at which it is worked off from the main heater, as explained.

2d, I claim passing the exhaust air which has propelled the piston directly through the fire, for the purpose of economizing heat, as set forth.

3d, In combination with a tight ash pit, into which the air for the support of combustion within the furnace is forced, I claim a chamber, D, communicating with the ash pit and surrounding the furnace for the passage of a portion of the air not required by the fire, which, combining with the products of combustion in the chamber, E, passes off through the flue, G, for the purpose of economizing heat, as set forth.

4th, I do not claim refrigerating the cylinder or piston of hot air or other engines by means of cold water, but I do claim the arrangement herein described of the tubes within the piston rod, the reservoir, R, and the india-rubber tubes, S S', for the purpose set forth.

MACHINE FOR FEEDING SHEETS OF PAPER TO PRINTING PRESSES.—Henry Clark, Cedar Keys, Fla. Letters Patent No. 10,824, dated April 25, 1854.

I claim loosening or detaching the top sheet of a layer of papers from those underneath it, by giving a part of said sheet a backward and forward motion, as herein shown, previously to its being operated upon by the pressure rollers or other device for conveying it to the printing press or other to which the sheet of paper is fed, for the purpose of insuring the feed of only a single sheet of paper at a time, as set forth

GLASS FURNACE.—Frederick G. Schaum, Baltimore, Md., administrator of Frederick Schaum, deceased. Letters Patent No. 10,830, dated April 25, 1854.

I claim making the external and internal configuration of the breast work of the furnace wall with the re-entering portions, so as to partly embrace the pots and to furnish room for additional or extra teaze or ring holes, substantially in the manner described.

PLATE FOR ARTIFICIAL TEETH.—Mahlon Loomis, Washington, D. C. Letters Patent No. 10,847, dated May 2, 1854.

I claim the improved manufacture of whole or half sets of porcelain or mineral teeth, substantially as described.

EXTENSION NOTICES.

Alexander Hay, administrator of the estate of M. C. A. Mellier, deceased, of Philadelphia, Pa., having petitioned for the extension of a patent granted to the said Mellier the 26th day of May, 1854 (said patent was also granted in France Aug. 7, 1854, and in England Oct. 26, 1855), for an improvement in making paper pulp, for seven years from the expiration of said patent, which takes place on the 7th day August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

Albert G. Safford, of Boston, Mass., having petitioned for the extension of a patent granted to him the 8th day of August, 1854, for an improvement in applying springs to window sashes, for seven years from the expiration of said patent, which takes place on the 8th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

Jarah W. Reed, administratrix of the estate of Cheeney Reed, deceased, and Jane E. Mould, administratrix of the estate of Brooks K. Mould, deceased, of Chicago, Ill., having petitioned for the extension of a patent granted to the said Cheeney Reed and Brooks K. Mould the 8th day of August, 1854, for an improvement in ventilating railroad cars, for seven years from the expiration of said patent, which takes place on the 8th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

Jacob Senneff, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 13th day of January, 1852 and additional improvement granted thereon the 20th day of July, 1852, for an improvement in metallic heddles, for seven years from the expiration of said patent, which took place on the 13th day of January, 1866, this application having been authorized by act of Congress, it is ordered that the said petition be heard at the Patent Office on Monday, the 20th day of July next.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

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910.—PREPARING IRON ORE FOR SMELTING, AND FURNACES THEREFOR.—Alois Thoma, New York city. March 17, 1868.

1 096.—SEWING MACHINE.—Geo. Rehfuss, Philadelphia, Pa. March 31, 1868.

1,109.—COTTON GIN.—Joseph H. Adams & Coombs, New York city. April 1, 1868.

1,212.—MODE OF VENEERING PAPER, CLOTH, LEATHER, ETC.—Samuel W Huntington, Augusta, Me. April 11, 1868.

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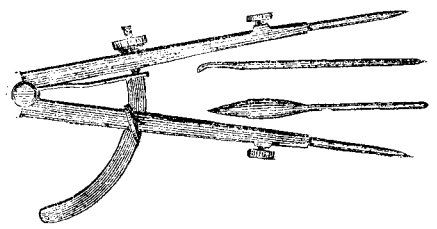

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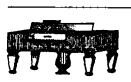

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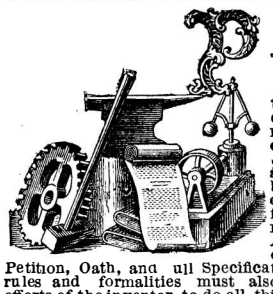

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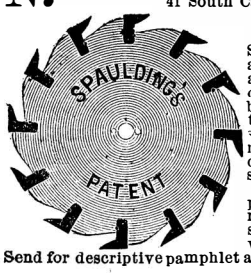

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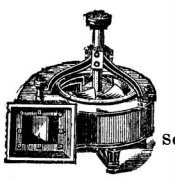

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